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1928 XIX

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The "Pou" Mystery

WHEN M. Henri Mignet published his first book on the construction of the *Pou-du-Ciel*, and when large numbers of amateur pilots began to build the machine in accordance with the instructions given in the book, one could foresee that, even apart from possible structural failures due to faulty workmanship or defective materials, there might ultimately be a certain number of accidents as a result of unskilled and ill-judged piloting. What no one could foresee was that a certain number of serious accidents would occur for which there was no ready explanation, and which were not due to errors of judgment on the part of the pilot. Unfortunately, such has been the case, and the *Pou-du-Ciel* has caused five fatal accidents in France and quite recently two more in Great Britain.

Had these accidents been in any way ascribable to pilots' errors, they would still have been very lamentable, but they would not have caused serious misgivings concerning the aircraft as a general type. Had one or two been due to structural failures, there would again have been no occasion for undue anxiety. Orthodox aeroplanes have suffered from such defects, and the exercise of special care in the selection of materials would have been a reasonable safeguard against repetitions.

C.G. Position

Experience has proved that the *Pou-du-Ciel* is very sensitive to centre-of-gravity position, and a shift of an inch or two may affect the flying qualities very considerably. A location has been found which has proved satisfactory in a large number of machines. Unless the centre of gravity is very far removed from the recommended position, it is not likely to cause catastrophic instability, although it may make a great deal of difference to the flying qualities.

From the evidence which has accumulated, it is beginning to appear that the relative wing positions are of more importance than centre-of-gravity position. The location of the front-wing hinge is obviously important, since a wing the centre of pressure of which is not quite stationary may become unstable by centre-of-pressure movements. It is even conceivable that in extreme cases such movements might, by a sudden increase in the angle of incidence, cause a stalling of the front wing, thereby precipitating a dive. Normally, this will not matter if the machine has sufficient height for recovery, but there is a possibility that certain wing arrangements may prevent the recovery.

Slot Effect

The relative position of front and rear wings of the *Pou-du-Ciel* is likely to have a profound effect on stability. For example, if the pylon carrying the front wing is shorter than recommended by Mignet, and if no limit is placed on the angle of incidence which the front wing can reach, one can imagine that a slot effect may be introduced which will prevent recovery. Too much overlap of the two wings may possibly have a similar effect.

If one imagines that the gap between the trailing edge of the front wing and the leading edge of the rear wing is capable of being made very small by increasing the front incidence, a set of conditions can be visualised which may lead to a dive from which recovery is difficult, or even impossible. It may be noted, in this connection, that, according to eye-witnesses of more than one of the fatal *Pou* accidents, they have happened when the machine, after flying at a considerable height, began to turn into wind for the approach to the aerodrome.

Should the machine be flying fairly close to the stalling speed of the front wing, a strong gust might cause the front wing to stall. The pilot would automatically pull back on his control lever; this would increase the front wing incidence and reduce the gap between the wing. The effect of the slot so formed would tend to

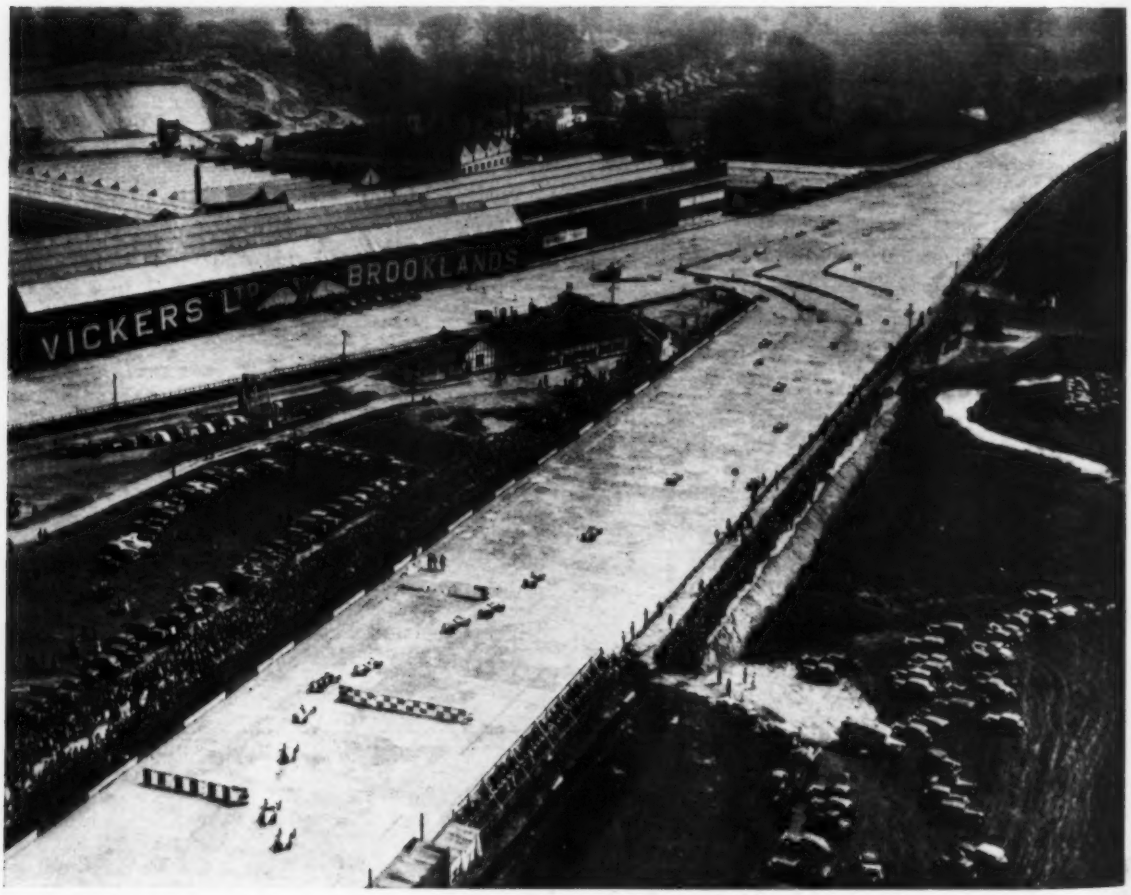
be an increase in the lift of the rear wing, which would bring the tail up still farther. The pilot would probably pull hard on the control lever, reducing the slot width to a very small size, thereby increasing the slot effect, aggravating the dive, and possibly making recovery impossible.

Obviously, these are mere theories, but they appear to tally with observed facts. What is wanted now is quantitative data concerning the limits of centre of gravity, vertical and horizontal wing positions between which no such instability could well occur. *Flight* suggested long ago that a *Pou-du-Ciel* should be tested in the full-size wind tunnel at Farnborough, where these things could be tested full scale and with the engine running. The latter may be important, as there is beginning to be a suspicion that the angle of the airscrew axis may also have something to do with the problem.

It may be that the full-size tunnel at Farnborough is already very hard put to it to keep pace with the work demanded of it in connection with the new types of military aircraft now being produced. That is an almost unanswerable argument, since national considerations must obviously take precedence. If it is borne in mind, however, that lives may be at stake, every effort should be made to discover once and for all the means whereby this pitching instability of certain *Poux* can be cured.

Let it be remembered that scores of *Poux* have flown hundreds of hours without disclosing any tendency to instability. It is therefore defensible to assume that the type is not necessarily unstable, but only some versions of it. The features of the design which may conceivably cause the instability should be thoroughly investigated without delay. There is talk of bans. It may be wise to suspend the flying of new *Poux* for the present. Examples which have already proved satisfactory should not be grounded.

In the meantime let all amateur constructors proceed with very extra caution. Let it be impressed upon them that particular things to look out for are: the hinge location on the front wing, the position of the centre of gravity, the gap between the two wings, and the amount of overlap. Remember that the *Pou-du-Ciel* is of very short length, and that therefore comparatively small changes in these features are likely to have greater effects than one might expect. A front-wing pylon rather taller than that shown in Mignet's book is not likely to cause serious trouble. A shorter almost certainly will. Too much wing overlap should also be looked upon as open to suspicion. And, finally, *Poux* pilots are warned that a too-sudden throttling back of the engine has sometimes been known to cause the machine to do unexpected things. The throttle should be worked gently.



A TITANIC STRUGGLE seen on a Lilliputian scale—a fine aerial impression of last Saturday's Empire Trophy Race at Brooklands, specially secured for our associated journal *The Autocar* by a *Flight* photographer. At the fork are the three S-bends of varying severity which formed the means of class handicapping. The picture also shows clearly the big new extensions to the works of Vickers (Aviation) Ltd.

The Outlook

A Running Commentary on Air Topics

In the Irish Free State

IT seems that Mr. Eamon de Valera's Government is cogitating an Air Transport Bill for the Irish Free State. Hitherto that Dominion seems to have managed without one, not because the Irish railways are so overwhelmingly efficient that no other form of transport would have any chance of success, but for other reasons. One of them may be that the climate of Ireland is even wetter than that of Great Britain. Something or other has now jogged the Government of the I.F.S. into an approach to airmindedness. It is not impossible that his something may be the prospect of Imperial Airways' trans-Atlantic service using a terminus in Ireland. It will be remembered that Alcock and Whitten Brown ended the first flight from Newfoundland in a Connemara bog, but it is not the idea that all trans-Atlantic flights should copy this precedent too meticulously. Lindbergh also might have come to rest in Ireland. He said that he planned his navigation across the Atlantic so that even if he made an error he would hit Europe somewhere between Ireland and Portugal.

Nothing definite has yet been published as to the western terminus of the coming service with America, and sites in both the I.F.S. and Northern Ireland have been considered. Plans are in hand for an airport at Cork. The *Irish Press*, which is Mr. de Valera's organ, says that the national air transport company which is to be established will finance or hold interest in air transport companies operating between the I.F.S. and other countries. It may be presumed that this does not imply an attempt to drive a hard bargain with Imperial Airways over the use of the Atlantic terminus. If there were any suggestion of this, it would be a reason for choosing a terminus in Northern Ireland, which is still enthusiastically part of the United Kingdom.

Falling Like a Sohn

WE must confess to some disappointment on witnessing Mr. Clem Sohn's "human bird" stunt—probably a result of believing too large a fraction of what the popular Press had been promising.

Remembering the loading which the man and his two parachutes must give the two bat-like wings and tail-between-the-legs, one always doubted the five-mile glide claims; yet, even so, one was not prepared for quite such a plummet-like dive as followed Mr. Sohn's departure, at 9,000ft., from a B.A. Swallow piloted by Flt. Lt. J. B. Wilson. True, his smoke trail showed a distinct departure from the vertical, and even a few odd twists and turns, but by no stretch of the imagination could the descent have been considered a flight or glide.

Nevertheless, there can have been very few among the huge crowd, flying folk included, who did not miss a heart-beat as the plucky Mr. Sohn streaked towards the ground, pulling his rip-cord with only another 800 short feet to go. The cheer which saluted him was as spontaneous as any we have ever heard.

It will be a magnificent stunt for air circuses, but all this talk of seriously developing it (and even of carrying "compact and light batteries" to actuate wing-flapping mechanism) merely suggests a return to the dark ages before the dawn of aeronautics; as Francis Bacon wrote: "The Leucacians in ancient time did use to precipitate a man from a high cliffe into the sea . . . fixing into his body divers feathers, spread, to breake the fall."

Still Cheaper Flying

THE scheme drawn up by the National League of Airmen to encourage business houses to subsidise members of their staffs who are keen on learning to fly has a good deal to recommend it.

Briefly, this scheme is intended to encourage a number of "staff clubs" made up of employees of one or more business houses. Each member pays 5s. a week in the first year and 3s. a week in the subsequent four years of membership. Since each club is to be composed of fifty members, and will be expected to purchase two aeroplanes (at £400 each) in the first year and one in every succeeding year, it is obvious that the employers must foot the bill to some extent.

However, until the present subsidy agreement expires the clubs should obtain £25 for each licence and £10 for each renewal, so that the costs will be kept down and the employers' subsidy is expected, in fact, to work out at £19 for each member during the first year.

As a method of getting more people into the air the idea is good, but it is doubtful if the scheme can be considered seriously as a means of creating a "pilots' pool" for any possible national emergency. A thorough course of training on a low-powered ultra-light aeroplane might save a few hours of *ab initio* service instruction on much larger and more powerful machines, but mere ability to fly, in any case, forms but a small part of the Service pilot's experience.

Exit the Area

THE Royal Air Force is organised in Squadrons (subdivided into Flights), Wings, Groups, Areas, and Commands. A Command, however, is an indefinite term, and up till the present both the Inland Area and the Coastal Area constituted Commands. On the other hand, the Fighting Area, the Western Area, and the Central Area were not in themselves Commands, but formed parts of what is known as the "Command, Air Defence of Great Britain." That Command also included one Group, No. 1 Air Defence Group, which controls the units of the Auxiliary Air Force. In this country Wings have of late been only temporary assemblies of Squadrons for such purposes as the Hendon Display, but there are three permanent Wings in India.

The expansion scheme has called for a good deal of reorganisation in the R.A.F., and the latest example of this is set forth on the Royal Air Force pages of this issue. Briefly, the term Area disappears for the time being from the organisation of the R.A.F. The Inland Area becomes the Training Command, which in the main gives a better indication of its functions; though it will not be logical to keep the army co-operation squadrons in the Command any longer. The Coastal Area likewise becomes the Coastal Command. The three subordinate Areas inside the A.D.G.B. Command are now graded down to Groups. As other Groups of bombers have to be formed to absorb the newly raised squadrons, this is a sensible step.

The idea may be that the term Area is a very dignified one and should not be made too common. An Area has always been commanded by at least an Air Vice-Marshal, and soon there may not be enough officers of that rank to give one to each new formation. But a Group can be commanded by a Group Captain.

The result of all this is that the Area has now become such a dignified affair that it has vanished altogether.

THE NEW MONOSPAR

General Aircraft's S.T.18. Cruising at Nearly 200 m.p.h. : Comfortable Accommodation for Ten Passengers : Reasons for Unusual Design

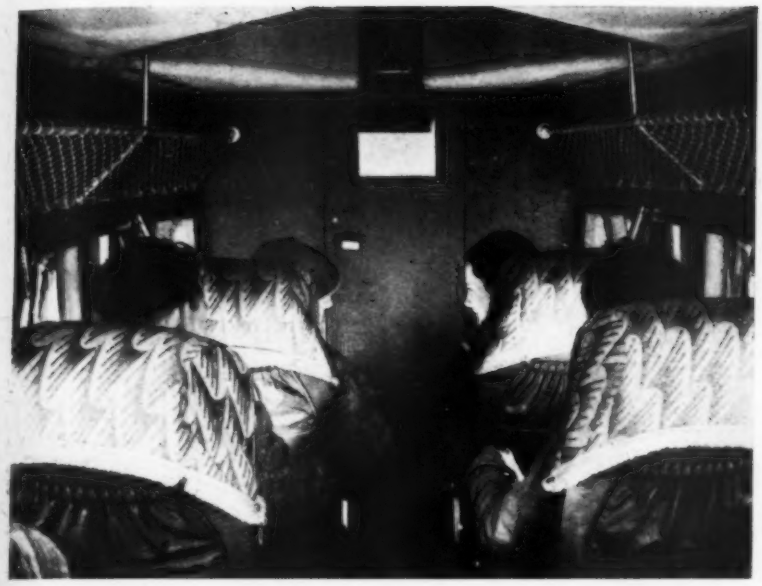
ONE'S reaction when seeing the new S.T.18 for the first time is to wonder at the somewhat unusual appearance of the machine. The very pronounced sweep-back of the wings, the short nose of the fuselage, which is almost in line with the two airscrews, the very low position of the tailplane over the ground, the straight bottom and somewhat hunch-backed shape of the fuselage are all features not commonly met with in twin-engined aircraft, and have obviously been introduced not merely for the sake of "being different," but for some very good reasons. *Flight* had an opportunity the other day of discussing these reasons with the designer of the machine, Mr. D. L. Hollis Williams, and it may be of interest if some of them are set out here before describing the details of the construction and internal arrangement of the machine.

It is a well-known fact that several modern high-speed twin-engined aeroplanes have a tendency to yaw slightly from side to side, a fact which points to a certain amount of directional instability. Another peculiarity of the twin engine arrangement is that, with one engine out of action, the rudder control necessary to hold the machine on its course is considerable, particularly if the engines are fairly widely spaced. Considerations such as these led to the adoption of the positioning of the fuselage rather unusually far back on the wing. Various effects result from this placing of the fuselage: the fuselage side area in front of the centre of gravity is reduced, that behind the centre of gravity is increased, and the lever arm, for a given fuselage length, on which the tail works, is increased. This rearward shift of the fuselage results, of course, in moving the centre of gravity back, and to restore the trim the sweep-back of the wings has been introduced.

The low tail position represents an attempt to make sure of getting the tail out of the area of disturbed airflow behind the wing at large angles of incidence; this disturbance, with certain relative tail positions, sometimes sets up the phenomenon known as tail buffeting. The unusual shape of the fuselage results from the other considerations on which the design is based.

Apart from any saving in structure weight which may result from the use of the Monospar type of wing construction, a very practical advantage arises in its particular application in the S.T.18. Owing to the fact that there is but a single spar, braced to the top longerons on each side, there is only need for a single bulkhead in the cabin to be a primary structure member. The location of the spar so far forward in the wing section, and the short nose of the fuselage to which reference has already been made, bring the position of this single bulkhead well forward so that it can be used to form a partition between the pilots' cockpit and the cabin. The passengers' quarters, as a result, are therefore quite unobstructed by transverse structure members.

The primary structure of the fuselage is of normal type,



In the cabin of the S.T.18, looking forward. The bulkhead which separates the cabin from the pilots' cockpit is the only one.

with four tubular longerons and tubular struts. The struts are arranged in the form of a Warren girder, their ends being joined by plates and rivets. No wire or tie-rod bracing is used. Fairings are added to the primary structure to give the desired external form. The covering is doped fabric.

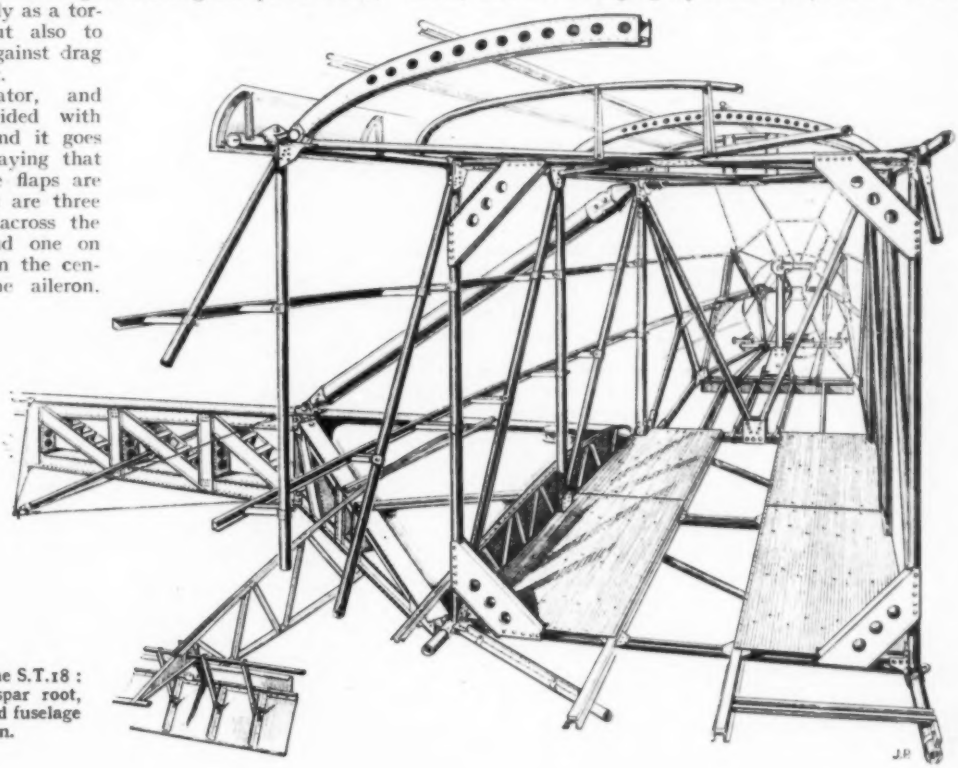
Single-spar construction is, of course, employed in the wing structure. The spar roots are attached to the lower longerons of the fuselage and serve, as in all monospar wings, to carry pure bending loads only. Torsion is of the normal monospar type, with tie-rod bracing outboard of the engines. In the wing roots a diagonal spar is added; this serves not only as a torsion member, but also to brace the wing against drag and engine thrust.

Ailerons, elevator, and rudder are provided with trimming tabs, and it goes almost without saying that split trailing edge flaps are fitted. The flaps are three in number, one across the centre section and one on each side, between the central flap and the aileron. Flexible material covers the gaps. The flaps are operated by push rods and links from a Dowty hydraulic unit.

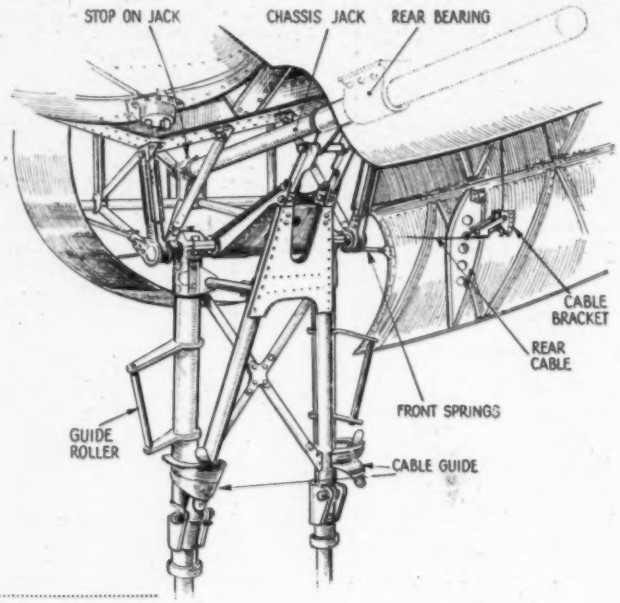
In the retractable undercarriage, use is made of Dowty telescopic legs. Each of the Dunlop wheels is carried by two legs, and the retracting mechanism is of Dowty hydraulic type, with a movable horizontal cylinder and a stationary piston. The cylinder carries the crosshead of the retracting mechanism, and is so arranged that with the wheel fully down the position is over dead centre, so that automatic locking is provided. In addition, there is a hydraulic lock which comes into operation when the undercarriage is retracted. The hydraulic pump is operated by an electric motor, and can also be operated by hand.

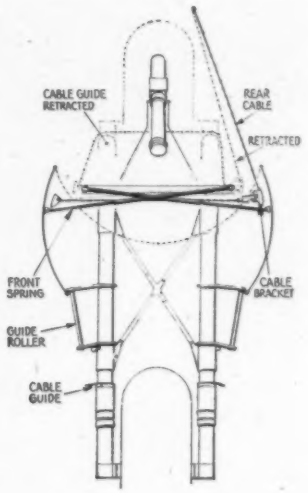
The Pratt and Whitney Wasp Junior engines are carried on welded steel tubes and are carefully faired into the wing. The cowling on the under side is divided and hinged, so that it opens when the wheels are lowered, and closes when the wheels are raised. The principle and details are shown in some of the sketches.

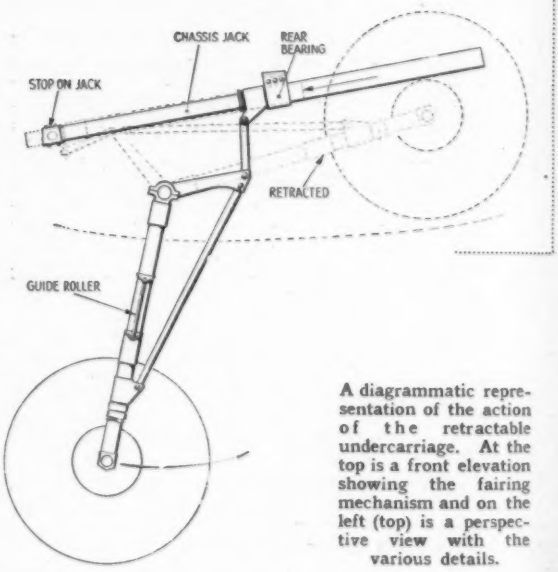
Cabin accommodation is provided for ten passengers. The upholstery and sound-proofing have been carried out by Rumbold, and although the engines, with their variable-pitch airscrews, are very noisy, the amount of noise which reaches the passengers is very greatly reduced. The seats are arranged in the orthodox way down each side of the cabin, with a central gangway between the rows. Behind



The backbone of the S.T.18: Details of main spar root, torsion member and fuselage construction.







A diagrammatic representation of the action of the retractable undercarriage. At the top is a front elevation showing the fairing mechanism and on the left (top) is a perspective view with the various details.

the cabin is a luggage compartment with a capacity of 41 cu. ft.

The temperature of the intake air is under the control of the pilot, so that not only can freezing of the carburetter be avoided, but, by feeding air of the right temperature to the engines, a maximum of power for all conditions can be obtained. As the machine is designed very much for all-weather flying, Goodrich de-icer equipment is fitted. Sperry blind-flying equipment is installed, the gyros being driven by vacuum pump from the engines. The air is taken from the cockpit to avoid freezing.

Very complete instrument and other equipment is carried. Reference has already been made to the blind-flying equipment. Smith's Aircraft Instruments have supplied the A.S.I., altimeter, turn and bank indicator, fore and aft level, compass (P.4), time-of-trip clock, cabin clock, rate of climb indicator, electric r.p.m. indicators (Record), oil gauges and thermometers, boost gauge, drift indicator, air log, cabin thermometer, electric fuel gauge, and landing headlamp with switch and dipping mechanism.

Demec navigation lights are fitted, and Rotax engine-driven generator. Interior lighting is by Bonella and Stedall and Co., the accumulator used being a Dagenite. The machine is equipped with R.T.E. radio. The price of the S.T.18 is £14,000. The first machine is named *Croydon*.

THE MONOSPAR S.T.18

Two 400 h.p. P. and W. Wasp Junior

Dimensions

	ft.	in.	m.
Length o.a.	43	3	13.2
Wing span	59	6	18.15
Height o.a.	13	5	4.12
Cabin length	14	2	4.32
Cabin width	5	4	1.63
Cabin height	5	11	1.81
Gross wing area (incl. fuselage)	519 sq. ft. (*48.3 m²*)		
Net wing area	454 sq. ft. (*42.2 m²*)		
Volume of Cabin	420 cu. ft. (*11.9 m³*).		

Weight Data

	lb.	kg.
Tare weight (equipped)	7,974	3,620
Disposable Load	3,526	1,600
Gross Weight	11,500	5,220
Ratio Gross wt. Tare wt. 1.44 Ten passengers	1,700	772
Two pilots	340	155
Cargo (luggage or mails)	300	136
Petrol (140 gals.)	1,078	490
Oil (12 gals.)	108	50

Performance

	m.p.h.	km./h.
Cruising speeds :—		
At sea level, 75% power	178	286
At 7,500 ft., 75% power	190	306
At 10,000 ft., 72% power	190	306
At sea level, 65% power	168	270
At 7,500 ft., 65% power	177	285
At 13,000 ft., 65% power	186	299
Max. speed, sea level, 1% power	190	306
Max. speed at 5,000 ft., 95% power	203	327
Rate of climb sea level	800 ft./min. (*4.1 m/sec.*)	
Rate of climb, 5,000 ft.	1,110 ft./min. (*5.6 m/sec.*)	
Service ceiling	19,500 ft. (*6,000 m.*)	
Service ceiling, one engine	7,500 ft. (*2,300 m.*)	
Max. cruising range, normal	745 miles (*1,200 km.*)	
Cruising range, 72% power, 10,000 ft.	630 miles (*1,014 km.*)	
Cruising range, 65% power, 13,000 ft.	650 miles (*1,045 km.*)	
Take-off run	260 yards (*238 m.*)	
Landing run (brakes)	250 yards (*229 m.*)	
Landing speed (no flaps)	69 m.p.h. (*111 km/h.*)	
Landing speed (flaps)	63 m.p.h. (*101 km/h.*)	

A CANTILEVER "POU"

Performance and Appearance Improved: Greater Strength for Less Weight

ONE of the disadvantages of the "100 per cent. Mignet" *Pou-du-Ciel* is that, with the cable controls below the wing, there is nothing but a slender telescopic strut to hold up the trailing edge when taxying, and the wing flaps rather alarmingly at times. Also, should the pivot be a little too far back, the centre of pressure can move ahead of the pivot and bring the trailing edge down, thereby causing the wing to stall. A dive may follow, and accidents which have occurred are thought to have been due to this. Introducing a rigid type of control, in the form of tubular struts from the operating cranks to the wing, gives the pilot the means of holding the trailing edge up, but then another possible trouble may arise. Should the wing be subjected to a down-load in flight, it has little strength and may collapse. Top bracing would probably cure this, but would add still more drag to a wing which is already plentifully supplied with that commodity.

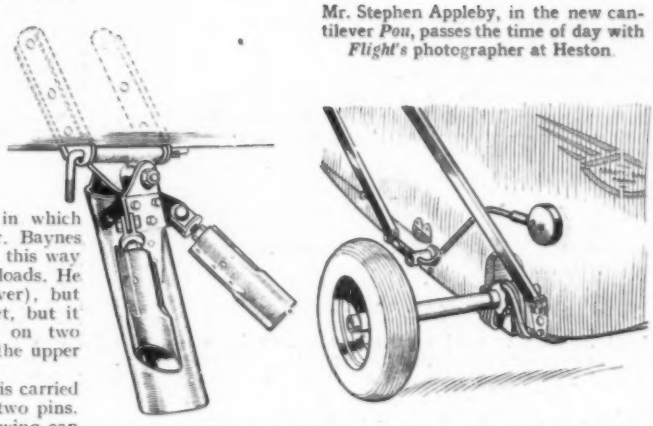
Mr. L. E. Baynes has designed, and Abbott-Baynes, of Farnham, have built, an improved *Pou* in which all these problems were taken into consideration. Mr. Baynes decided to make the wing of cantilever form, and in this way it is as strong under down-loads as under normal up-loads. He has retained the single spar (of box section, however), but uses a different wing section (do not tell M. Mignet, but it has a rounded leading edge!), and carries the wing on two tripods, very much in the manner made familiar by the upper wings of the Fokker biplanes.

On the two points of these tripods the front wing is carried in trunnions, and may be detached by withdrawing two pins. When the control struts have been disconnected, the wing can be lifted off the fuselage. The rear wing is, of course, carried directly on the top of the fuselage. Dismantling or erecting the wings occupies but three or four minutes.

To avoid any possibility of wing flutter, Mr. Baynes has incorporated a mass balance system. Apparently it has not occurred to anyone before that a wing pivoted as is the front wing of the *Pou* might need a mass balance; yet it is fairly obvious that such may well be the case. A mass balance on the wing itself would have been very heavy, and Mr. Baynes hit upon the idea of mounting the weights on arms projecting forward from the incidence control tube. Owing to the gearing between crank and wing, much smaller weights suffice to mass balance the wing.

In aerodynamic design the new machine is a big step forward in *Pou* development. The 30 h.p. Carden engine is neatly installed. (*Flight* photograph.)

Mr. Stephen Appleby, in the new cantilever *Pou*, passes the time of day with *Flight's* photographer at Heston.



The cantilever wing is pivoted on trunnions at two points and may be detached by withdrawing two pins. On the right is a sketch of the mass balance on one of the arms which operate the wing control rods.

Of improved aerodynamic form, the fuselage has been considerably strengthened in the region of the cockpit. Otherwise it is generally similar to the previous Abbott-Baynes *Pou*.

According to Mr. Appleby, the new machine is more stable, has a less severe stall, and is nicer to handle in every sense. This can well be believed after seeing his demonstration at Heston last week. Full control is available at 40 m.p.h.

CANTILEVER POU

Carden Engine : 30 h.p.

Span	22 ft.
Length	12 ft.
Weight, empty	327 lb.
Weight, loaded	550 lb.
Top speed	80 m.p.h.
Cruising speed	70 m.p.h.
Take-off run	100 yd.
Initial climb	400 ft./min
Price complete	£198

Makers: Abbott-Baynes Aircraft, Ltd., Farnham, Surrey.

Mrs. Mollison's Flight

AT the time of going to press, Mrs. Amy Mollison was making good progress on her England-Capetown flight in the Percival Gull (Gipsy Six). She is taking the West Coast route.

Mrs. Mollison left Gravesend at 9.5 a.m. on Monday, and completed the 1,150 miles to Oran by 5.5 p.m. (B.S.T.). She took off from there at 6.36 p.m. and made an all-night flight of 1,250 miles over the Sahara, landing at Gao at 4.45 a.m. on Tuesday.

Continuing at 7.30 a.m., she made an unscheduled but brief stop at Niamey, French West Africa, and then took off for Pointe Noire (French Congo).

A.I.D. IN EXPANSIVE MOOD

Problems of Increased Production the Main Theme of Lord Swinton and Other Speakers at A.I.D. T.S.A. Dinner

SINCE its inception the Aircraft Inspection Directorate has been called a good many names, some flattering, some otherwise. Viscount Swinton, Secretary of State for Air, added another, last Friday at the annual dinner of the A.I.D. Technical Staff Association, when he referred to them as "The Old Contemptibles of the Air Ministry." Starting as a very small band of inspectors, the A.I.D. grew to large proportions during the war, then had to be reduced almost to nothing, and now it was again increasing in size. In addition to giving the A.I.D. a new name, Lord Swinton also suggested a motto of a single word, "Thorough."

Lord Swinton was the principal guest at the eleventh annual dinner of the A.I.D. Technical Staff Association, held at the Holborn Restaurant, and said the day happened to be his birthday, and a very pleasant one it had proved to be. Earlier in the day he had been flying in one of the latest bombers—with so many constructors present he would not say which one—and had been very impressed. [Actually the machine was the Fairey Battle.—ED.]

The new types now coming into production were a great tribute to the joint work of the Air Ministry, the industry and research. He knew from personal experience that foreign observers whose opinion was unbiased and who wanted to place orders, held the view that British aviation products were second to none.

Confidence

Lord Swinton referred to the new system by which new machines went into production much more quickly than before, and said that this system might be regarded by some as a risk. He preferred to look upon it as an expression of the confidence of the Air Ministry in the aircraft industry.

The *morale* of the Air Force was, perhaps, of even greater importance than the *morale* of the other services. *Morale* depended upon tradition, training and confidence. All those present that evening were contributing to the confidence and thus to the *morale* of the Air Force.

It was often said that the R.A.F. expansion was a warlike measure. He did not look upon it that way. A strong British Air Force represented something more than the will to peace; it represented the *means* to keep the peace.

When referring to the growth of the aircraft industry and of the A.I.D., Lord Swinton made the interesting announcement that he had that day appointed the first Deputy Director of the A.I.D. The choice had fallen on Group Captain G. B. Hynes, D.S.O. (Until his appointment to the post of Deputy Director, Group Captain Hynes was Chief Inspector (Engines) in the Directorate of Aeronautical Inspection.—ED.)

Replying to the toast "The A.I.D.," the Director of Aeronautical Inspection, Lt.-Col. H. W. S. Outram, referred to the very critical period through which the A.I.D. had passed and was passing. The expansion, and the extra work which it entailed, had got well under way, thanks very largely to the excellent co-operation of the firms' inspection staffs. More than 6,000 whole-time inspectors were now engaged by the firms; they had had their own difficulties, but in spite of them they had carried the extra load with complete success.

Referring to the A.I.D., Col. Outram said that last year the A.I.D. numbered about 500. This year it had increased to about 1,000. He thanked his staff for training and making into human beings some 500 recruits in one year! Col. Outram also announced that no fewer than fifty-one were entitled to the replica of the old A.I.D. badge, which it had been decided to issue to all those with more than twenty years' service in the A.I.D.

Mr. A. McIsaac proposed the toast of the visitors, and replies were made by Lt.-Col. H. A. P. Disney, the new Director of Production, and Mr. F. S. Spriggs.

Lt.-Col. Disney said he severed his connection with the Air Force some twenty years ago, and caused much amusement by recalling that once a highly placed R.A.F. officer had referred to him as the most unscrupulous officer there ever was. Although he had been in office only one month, Col. Disney said he had already visited many of the aircraft works. They had all treated him as a very efficient waste-paper basket, pouring their troubles into him, but he had had no single complaint about the A.I.D.

Humour

Mr. F. S. Spriggs, who is chairman of the Gloster Aircraft Co., director and general manager of Hawker Aircraft, and managing director of the Hawker-Siddeley Development Co., jestingly said this was the first time that august assembly had been addressed from the proletarian section of the room (referring to the fact that he was not at the "top table"); he hoped they appreciated the honour. He was delighted to return thanks on behalf of his fellow guests, representatives of that flower of British manhood—the British aircraft industry. Judging by their appearance, the hospitality had been greatly appreciated, and from evidence afforded by their side elevations capacity had been taxed to the utmost and individual expansion programmes were nearing completion.

He was not quite certain of the subtle difference between A.I.D. and T.S.A. One might know its job, and the other might know it too well; but all were agreed that the organisers of the evening knew their job and were, in fact, almost worthy of a job in the industry!

Mr. Spriggs concluded a very amusing speech by saying that they all had their problems. The Air Ministry with their confidential expansion programme, which the Press would not discuss; the industry with its plans to cope with this programme, which the Air Ministry would not discuss; and the T.S.A. and A.I.D. with plans which they were only too anxious to discuss.

Mr. J. A. Webster paid a tribute to Mr. Jack Jarvis, who had organised these dinners for thirteen years (two being before the formation of the T.S.A.). Mr. Jarvis said a few words to explain that if the guests were happy so was he. He afterwards informed *Flight* that 526 people sat down to dinner, of whom 217 were A.I.D. hosts, the rest being guests.

The evening finished with an excellent programme of entertainment, and it was noted that Lord Swinton enjoyed it to the end.

Forthcoming Events

May 15-June 1. Stockholm Aero Show.
May 23. Empire Air Day.
May 27-June 4. Austrian Aero Club: Whitsun Tour.
May 29-June 2. Swiss Aero Club: Whitsun Tour.
May 30-June 1. Isle of Man Air Races.
May 30-June 1. Aero Club de Provence: Marseilles Week-end.
May 30-June 2. Yorkshire Gliding Club: Open Meeting and Competitions.
June 6. R.A.F. Flying Club: Annual Display.
June 6-14. Czechoslovakia Aero Club: Tour.
June 7. London Air Park Club: Hanworth Garden Party.
June 13-14. Opening of Brighton, Hove and Worthing Airport: International Rally.
June 20. Brooklands "At Home."
June 27. Royal Air Force Display, Hendon.
July 2-5. Belgian Aviation Clubs; Tour Aerien Belgique.
July 10 and 11. King's Cup Race.
July 18. Portsmouth Aero Club: Isle of Wight Race.
July 23-26. R.Ae.C.: Week-end Aerien.
August 1. Cinque Ports Club: Folkestone Trophy Race.
August 1-3. Yorkshire Gliding Club: Open Meeting.
August 2-15. Yorkshire Gliding Club: Instruction Camp.
August 3. Ramsgate Airport: *Pou-du-Ciel* Race.
Aug. 8. Reading Aero Club: Northesk Cup Competition for Women Pilots.
August 15-30. Yorkshire Gliding Club: Open Meeting and Competitions.
August 29-30. Cinque Ports Club: International Rally and Wakefield Cup Race.
August 30. Gordon Bennett Balloon Race, Poland.
September 5-6. Aero Club of Hungary: Week-end Aerien.
September 12. London Aeroplane Club: Hatfield Garden Party.
September 13. Aero Club de France: Coupe Deutsch Race.
September 20 London Air Park Club: Display.
October 25. Aero Club de France: Saigon Race.
November 13-29. Fifteenth International Aero Exhibition, Paris.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

TURKISH DELIGHT: The Turkish consul and representatives of Turkish State Airways examine with interest one of the three D.H. Rapides which the company has just acquired. By arrangement with the French, the machines will be used on the Istanbul-Aleppo section of the French Indo-China service.

NEARLY all France's obsolete military aeroplanes will have been replaced by August.

A plant for turning 6,000,000 tons of coal into smokeless fuel, oil and petrol is to be erected near Bolsover Colliery, Derbyshire.

Miss Amelia Earhart, the only woman to have flown solo across the Atlantic ocean, is planning a round-the-world flight from east to west in a Lockhead Electra.

Plans are being made by the Panchan Lama of Tibet to establish an air service linking Lhasa, the "Forbidden City," with the sea, either on the Chinese or the Indian side.

A Beechcraft intended for the Emperor of Abyssinia and piloted by M. Drouillet landed in Rome last week through engine trouble and was seized by the authorities. It is alleged to have left France without permission.

Professor Piccard has received 22 replies to his advertisement stating that he is willing to take into the stratosphere anyone who will pay £20,000 towards his next ascent, to be made from Poland.

Gigantic anthills are among the hazards encountered at certain aerodromes in Abyssinia. A force of natives is continually battering down the hills, but the ants built so rapidly that pilots have to exercise extreme caution.

A Seversky two-seater fighter with 750 h.p. Wright Cyclone is claimed to do 280 m.p.h. at 11,000 feet.

"Archie" at Olympia

The 51st Territorial Anti-Aircraft Brigade (which forms the subject of an article in this issue) takes part in the air-defence display at the Royal Tournament; which opens at Olympia to-day.

To Film the Eclipse

Aeroplanes and balloons will be used from a number of points in Russia to observe the total eclipse of the sun on June 19. From one balloon, which will ascend from the North Caucasus to a height of six or seven miles, it is hoped to film the movement of the moon's shadow over the earth.

Practical Interest

The presentation by Mr. Lindsay Everard, M.P., of a Moth Major to the Leicestershire Aero Club, of which he is president, has already been reported. Mr. Everard is now having a Percival Vega Gull built for the King's Cup Race. Thirdly, his aerodrome at Ratcliffe will be the scene of a big international aeronautical gathering on July 26.

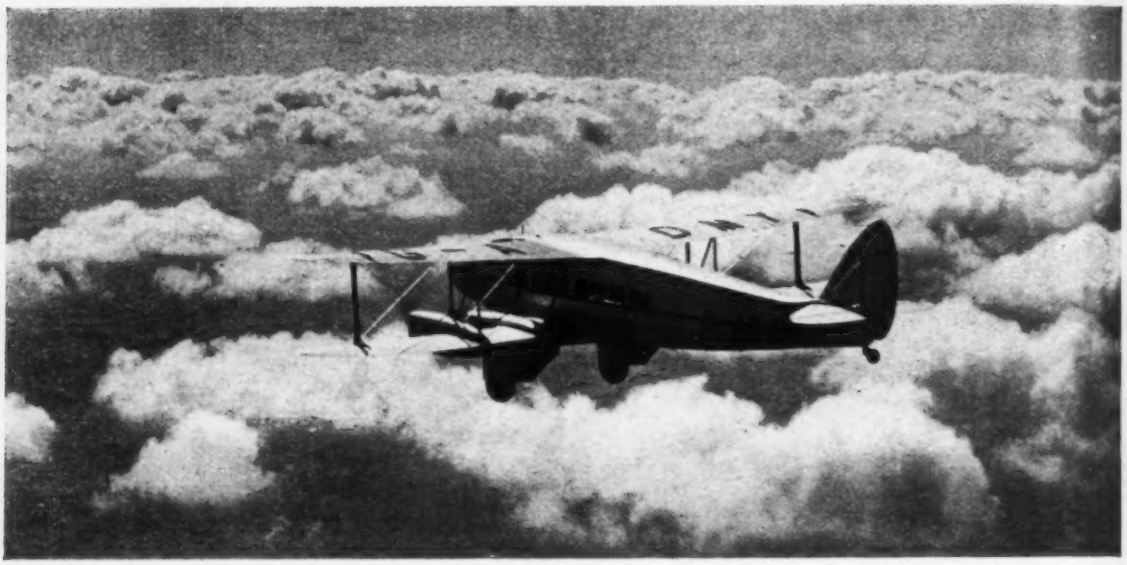
R.Ae.S. Awards

AT a meeting of the Amulree Committee the following awards were made on the recommendation of the Council of the R.Ae.S.: British Gold Medal for Aeronautics, to Dr. Hugo Eckener "for his technical achievements in lighter-than-air craft"; British Silver Medal for Aeronautics, to Mr. A. J. Rowledge, "for his scientific achievements in the development of aircraft engines."

IMPROVING ON ICARUS: Mr. Clem Sohn, the so-called "birdman" who performed his famous feat at Hanworth last Saturday (see p. 477) carries two Irvins (the other is behind) in addition to his wings. (*Flight* photograph.)

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



FLYING AT ITS BEST: British Continental Airways' D.H. 86 above the clouds in Surrey. Very shortly this company will be taking delivery of the first pair of four 86As, which will be fitted with Marconi two-way radio and a specially long fixed aerial. Lorenz short-wave receiving equipment will also be installed and all the instruments will be calibrated in the metric system. (*Flight* photograph).

THE WEEK AT CROYDON

Racegoers' Specials : Imaginary Accidents : Nurses in Uniform : On the Spot : Navigational : Last-Minute Arrivals

BRISK business was done during the period of the Newmarket races by Olley Air Service, who ran what was practically a regular service there from Croydon. Full loads of racegoers were the order of the day, and a number of eminent people were carried—including Steve Donoghue, who had missed his train after arriving by air from Paris. This firm has also had trips to Vienna and Monte Carlo, and the usual spring rush of special charter work to the south of France. A firm at Heston, incidentally—British-American Air Services—specialise in this racegoing business.

When the fading snowdrop is replaced by the snowy-white cap cover at our airports (on May 1) a "silly season" always seems to start amongst those who doze along the sea coasts. Last week there were two reports from amateur watchers about aeroplanes seen to dive violently into the sea. One came from the French coast, and was circumstantial enough to specify a white monoplane of British nationality. If you wake with a start, some minutes after you have seen an aeroplane, and see a gull dive after a fish, you may convince yourself that you have witnessed some tragedy, I suppose. Anyway, these baseless rumours are a great nuisance to the authorities, who dare not ignore them, and are a constant source of anxiety when private aeroplanes may be crossing the Channel.

The party of Clifton College boys who went to Germany recently, sixteen of them, returned by Sabena last week in a Savoia-Marchetti. British schoolboys travelling from Germany in a Belgian machine of Italian origin should acquire a reasonably international outlook.

The thrill of our lives last week was the appearance in our midst of a smartly uniformed nurse. Speculation ran riot. Was she there to look after the senile elders who are always boasting that they have been at Croydon man and boy for the last twenty-five years, or was she attached to the "pink and whites" of the Imperial Airways preparatory school, where the practice of drying thoroughly behind the ears is said to be in abeyance? In the end it was found that the nurse was employed by Commercial Air Hire, and this was said by the ribald-minded to account for the bottles of milk seen outside that firm's door, and for the rosy complexions of C.A.H. pilots. Cries of "Hullo, baby, how's nurse?" greeted these unfortunates wherever they went.

Actually the move is a very sound one, in view of the air ambulance organisation of C.A.H., and it is interesting to note that nurses are eventually to be employed also as air stewardesses on all C.A.H. passenger services. Incidentally, as announced last week, this firm has scheduled a new Paris service.

It does not appear to be generally known that, if you want to send an urgent letter by air mail and have missed the departure, you can telephone a message to the Croydon Aerodrome Post Office and this will be sent by the next air mail departure.

Brian Allen Aviation now have a complete dark-room installation at the aerodrome. Pilot and photographer dwell together near the airport, and, according to rumour, sleep in full flying kit and helmets with cameras strapped on. If the 'phone rings they slide down the greased water pipe outside their bedroom window and are on the job before others have stretched and yawned.

Capt. Wilcockson, of Imperial Airways, is one of those we see around with arms full of technical books, with slide rules sticking out of pockets, and with furrowed brows. He is sitting for his first-class navigator's ticket in view of the Empire and Atlantic services. Unfortunately it is necessary, but it does seem peculiar to expect men who have developed wizard weather sense, and instincts for flying undreamed of by the theorists, to pass all sorts of examinations in which all the usual examiners' snares are so often regarded as a test of true knowledge.

One of the Douglas pilots told me last week that he had made a trip to England two minutes under schedule time with tail wind so light as to be negligible, and using only 40 per cent. of the engine power. Conversely, even against very strong head winds, schedules can be kept with machines having big power reserves.

Others see us otherwise than we see ourselves. You can't see much when you are up to your eyes in a job. A business man visiting Croydon lately was most impressed by the fact that firms running five to eight regular services each way daily got away almost invariably on the tick of time. He did not know the difficulties caused by passengers, who have to be put through a good five minutes of formalities, arriving at the very last minute.

A. VIATOR.

All the Aids

AIRWORK has received instructions to install Lorenz blind approach receiving equipment in one of Jersey Airways' D.H. 86 machines. British Continental Airways and British Airways have already stated their intention of similarly equipping those machines to be used on the Scandinavian route. Hamburg is already equipped with the necessary ground stations, and both Copenhagen and Stockholm are expected to be equipped this summer. Amsterdam has at present its own medium-wave approach station.

Australian Mail

IN consequence of the duplication of the Singapore-Brisbane service, air mails for the Dutch East Indies, Australia and New Zealand will, starting with yesterday's despatch from London, be sent on both Wednesday and Saturday. The duplication of the homeward service will commence with a despatch from Brisbane on May 16.

The connecting internal air service to Perth (Western Australia) will, for the present, continue to operate only in connection with the service leaving London on Saturday.

British Airways' Summer Plans

DURING this season British Airways (Hillmans, United and Spartan) will not be running a through service from London to Belfast and Glasgow, but will, instead, concentrate on the Irish Sea services and on those to Paris and Scandinavia. Farther north, British Airways subsidiary companies, Northern and Scottish Airways and Highland Airways, will work between Glasgow and Campbelltown, Islay, Skye, South Uist and North Uist, and between Inverness, Wick, Aberdeen, Kirkwall and Lerwick respectively.

British Airways proper will run thrice daily return services to Paris, one to Holland, Germany and Scandinavia, three between Liverpool, Blackpool and the Isle of Man, and others between the Isle of Man, Carlisle and Belfast, and between Belfast (Ards), Liverpol and Glasgow.

On May 16 the company will move to Gatwick, so that some changes in the Continental time-table will be necessary.

Official Approval

THE appearance of a *Notice to Airmen* (No. 48) dealing with Heston's ultra short-wave blind-approach system appears to stamp it with guarded official approval. In this *Notice* various facts are given which have not been previously published in detail.

The main beacon, which works on 9 metres and is located a hundred yards outside the west boundary, projects an equi-signal zone, 4 deg. in width, centred on a bearing of 82 deg. true. A similar zone is projected on a reciprocal bearing of 262 deg. true, though this is not normally used. Dashes are transmitted in the northern sector and dots in the southern sector.

Marker beacons (7.89 metres) are placed only on the 82 degree zone, one being situated two miles and the other 400 yards from the eastern boundary. The outer and inner markers emit notes of comparatively low and high pitch respectively. The first marker signals heard during the approach will sound at the rate of two a second, while the inner beacon signals will be heard at the rate of six a second, each, of course, being superimposed on the main beacon note.

A plan of Heston with the main beam track was published in the special airports issue of *Flight* (January 30).

Air France's Mediterranean Fleet

THE Mediterranean fleet of flying boats with which Air France operates her three services—Marseilles-Algiers, Marseilles-Tunis, and Marseilles-Bayrouth—will, when complete, comprise seventeen machines, twelve Lioré et Olivier, 24-2s (four Gnome-Rhône K 7s) and five Breguet Saigons (three Hispano-Suiza 12 Y Brs-1).

The Liorés are now nearly all delivered, the third of the final batch of four having just flown. These will be added to the first batch of eight now being used, leaving only one more Lioré to complete the fleet of twelve. The Saigons, so far, are represented only by the first, which is now plying between Marseilles and Algiers, but the second of this batch is almost ready, and Air France have decided to acquire three more. It will be noted that twin-engined craft have completely disappeared from the Mediterranean services, the C.A.M.S. having been withdrawn in favour of the new three- and four-engined craft.

Germany's North Atlantic Plans

WITH the accumulated experience of their South Atlantic services, D.L.H. should now be ready to make an attack on the North Atlantic. Before the end of this month a third catapult ship, the *Ostmark*, will be ready to go out to Bathurst, so that either the *Schwabenland* or the *Westfalen* will be free for other work. A fourth ship is on the way and these two new boats, of course, are being built from first to last for their job and are not converted cargo vessels.

It is a significant fact that D.L.H. are interesting themselves in seaplanes for the northern route—the first Blohm and Voss, with four Jumo diesels, should be flying this summer—since these provide a better payload, and with four engines there should be little need to consider the possibilities of a forced landing. However, it is probable, one learns, that Dornier boats of the *Monsun* type (two Jumo IV diesels) will be used for the initial experiments.

Laying the Foundations

ON May 15 Crilly Airways will introduce a daily holiday service to Plymouth, calling at Southampton. The first machine will leave Croydon at 12 noon and reach Plymouth at 2 p.m. The fare will be 55s. single and 100s. return. The return machine will leave Plymouth at 4 p.m.

The existing Leicester-Bristol service will be extended to Plymouth on the same day, leaving Leicester at 10 a.m. and arriving at Plymouth at noon.

A Saturday evening "theatre" service between Leicester and Croydon and between Bristol and Croydon or Heston will be introduced on May 16. Theatregoers will be flown from the Midland and West of England and conveyed to any London theatre and back home, either the same night or first thing next morning, at an inclusive charge. The service will be extended should its popularity justify it.

For business houses and tourists special travel vouchers permitting 1,000 miles of air travel for ten guineas are available on all Crilly inland air routes. These vouchers are transferable and exhausted by mileage only. The provision of private secretarial services in the company's offices at each airport touched by Crilly Airways will be another feature of their plans.

The company is carrying freight at the low rate of 2d. per lb. on contract, and has recently arranged for a ten-year lease of the hangars, repair shops and offices which the Leicester Corporation is erecting at Braunstone. Work on the new premises has already begun.

Commercial Aviation

P.A.A. and the South Pacific

UNDER the agreement signed on November 29, 1935, between the N.Z. Government and Pan-American Airways, the Pacific service should be in regular operation before the end of the current year—though, if unforeseen difficulties arise, the Minister of Transport may permit an extension of another year.

The company's experts have carried out an extensive survey over the northern portion of the route during the last few months, and are expected at Auckland to report on the terminal facilities there. Lt. Stephens, a leading navy meteorologist, is one of those engaged on the very necessary study of weather conditions over the route.

For South Africa's Ju.86s

THE three twin-engined Ju.86 machines (Rolls-Royce Kestrel XVI engines) which have recently been ordered by South African Airways are to be fitted with Marconi radio equipment. The now well-known combined medium and short-wave equipment (type A.D.37/38) with "homing" device (A.D.52)—used on Imperial Airways' Empire routes—is to be installed.

The Junkers Ju-52s previously bought by S.A.A. also carry Marconi installations.

Incidentally, Swissair should by now have obtained delivery of their own Ju86 freighter, which was expected to have Jumo diesels.

Flying Boats Across India

A PARTY, consisting of Mr. F. Tymms, D.C.A. in India, Major H. G. Brackley, Air Superintendent of Imperial Airways, Capt. A. G. Wyatt, Engineer Officer, Civil Aviation of India, and two others, recently made a flying tour of inspection of the proposed flying-boat route across India in order to select bases and make other arrangements in connection with the future Empire services. They flew from Karachi to Calcutta, stopping at various stations on the way. Flying-boat bases, it is understood, will be established at Karachi, Sardar Samand, Gwalior (Tighara), Allahabad and Calcutta. The first flying boat will make experimental trip very shortly—if it has not already made it.

So far as Calcutta is concerned, the flying-boat base is likely to be near the Akra Beach, six or so miles down the river. If this is found to be impracticable, the alternative site will be north of the Willingdon Bridge.

Aerodrome Planning

WITH the steady development of civil aviation in this country and abroad, it is not surprising that the architectural and similar professions are taking a very keen interest in aerodrome planning.

In *The Architects' Journal* of April 16 there appeared a very thorough supplement dealing with the subject, and this should provide a useful work of reference to all those who are connected with aerodrome development.

Blackpool in Europe

ON Wednesday of next week a delegation consisting of members of the corporation of Blackpool will leave Stanley Park for a flying tour of Europe. A D.H. 86 has been chartered for the flight and the party will include Councillor W. Rostron Duckworth, Mr. J. Roland Robinson, and Mr. Trevor T. Jones, respectively Deputy Mayor, Member of Parliament for the Borough and Deputy Town Clerk. This is probably the first occasion on which a civic delegation has undertaken such a tour.

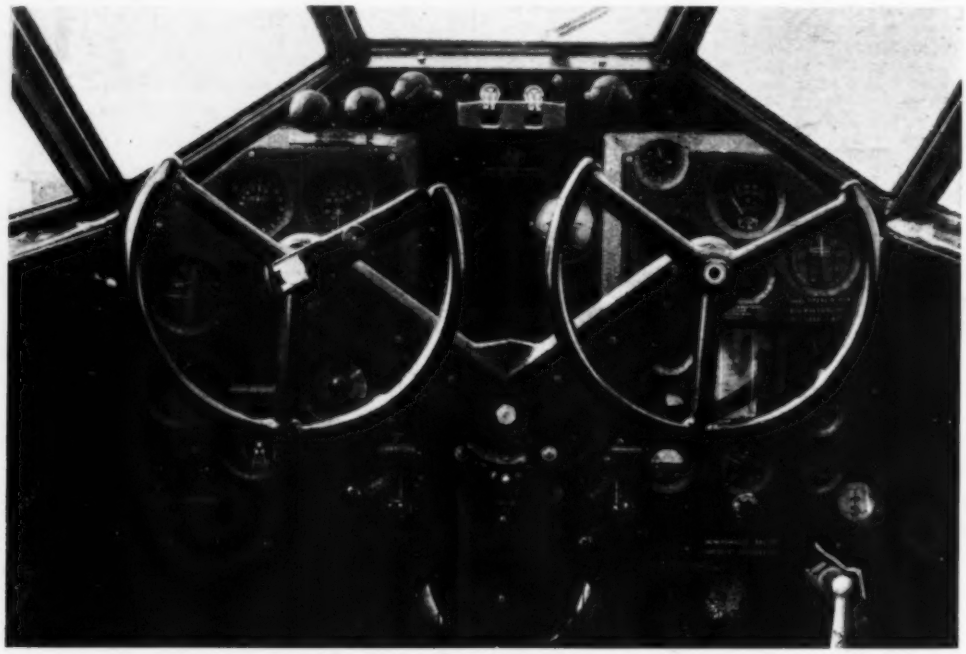
Canadian Record

IT is doubtful if any country in the world carried more freight by air last year than Canada. The total weight of flying cargoes was nearly 27,000,000 lb., of which air mails accounted for well over a million. Last year Canadian Airways flew 1,675,018 miles, yet this is only one of Canada's ten air concerns, and recently one company obtained what was probably the largest single air transport contract in history—the conveyance of a million pounds' weight of machinery. At a conservative estimate, 18,000 prospectors were flown during the same period to their destinations.

Swissair Regularity

WHEN the new Swissair air terminus was opened in Zurich, Mr. W. Mittelholzer, in his speech of welcome, remarked that the winter Zurich-London service had been especially a great success. Only two services failed to reach the terminus, being compelled by very bad weather conditions to land in Paris, and more than 80 per cent. of all seats available were booked as an average for every journey.

At the new office a teleprinter has been installed, so that the booking office will be in constant touch with all airports of Switzerland as well as with all the stations in Europe possessing such an instrument.



SYMMETRY: The control and instrument layout of the Monospar S.T.18 which is fully described on pp. 478-480 of this issue. It will be seen that some of the more important instruments are on the first pilot's dashboard, while the Sperry panel is mounted in the centre.

THE GUNS

A Visit to the 51st (London) Anti-Aircraft Brigade, R.A. (T.A.)

By Major F. A. de V. ROBERTSON, V.D.

LISTEN to the words of an American pilot in a crack fighter squadron: "I realise," wrote Norman Archibald in *Heaven High—Hell Deep*, "that a pilot's first flight over the lines might easily affect his flying attitude for all time. The *WOOF* of anti-aircraft explosions means they are from two hundred to five hundred feet away. But when *CRACK* thunders in your ear, it warns that shells are exploding within a hundred feet. If one bursts beneath you, rending a hole in the air, the 'plane, tossed like a cork from the sudden gush of wind, drops helplessly and out of control through the created vacuum until thick air is reached. Some pilots, who, without warning, hear the terrific *CRACK*, for ever have a dread of anti-aircraft. Others, if shells break close by and shrapnell tears their wings, or if their 'plane is tossed by the sudden blast, become shell-shocked, 'lose their nerve,' and are sent from the Front. It either does or does not happen. There is no way to forestall it."

That gives the views of an experienced fighter pilot on the effect which anti-aircraft guns may have on some nervous systems. It is true that many pilots, once they had gained experience, felt no fear that they would ever be brought down by gun fire, and likewise experienced gunners knew that once a pilot began to dodge about it was useless to waste more ammunition on him. But the unwary pilot who flew on a straight and steady course was always asking for trouble, and not seldom the guns complied with his request. On the last raid on London in May, 1918, our anti-aircraft guns brought down three German bombers.

Even if the guns do not bring down a raider, they nevertheless play a very important part in the air defence of London and of Great Britain. In the first place, they force the raiders to fly high. There is no probability that aeroplanes will be able to fly completely out of the range of gun fire. Guns can always be made which can throw shells to any height which aeroplanes are likely to reach. But the higher that the raiders fly the longer time does it take a shell to reach their height, and therefore the greater chance of a miss. By the same token, the higher that the raiders fly the less likely are they to score a hit on their objective with their bombs; and so the guns play a very useful part in protecting the country. If, at the same time, they drive the raiders off their course they have done a still greater service. If they force the formation to break up, not only is the raid upset at once, but the task of the defending fighters is rendered much easier. Day bombers who break formation run grievious risks.

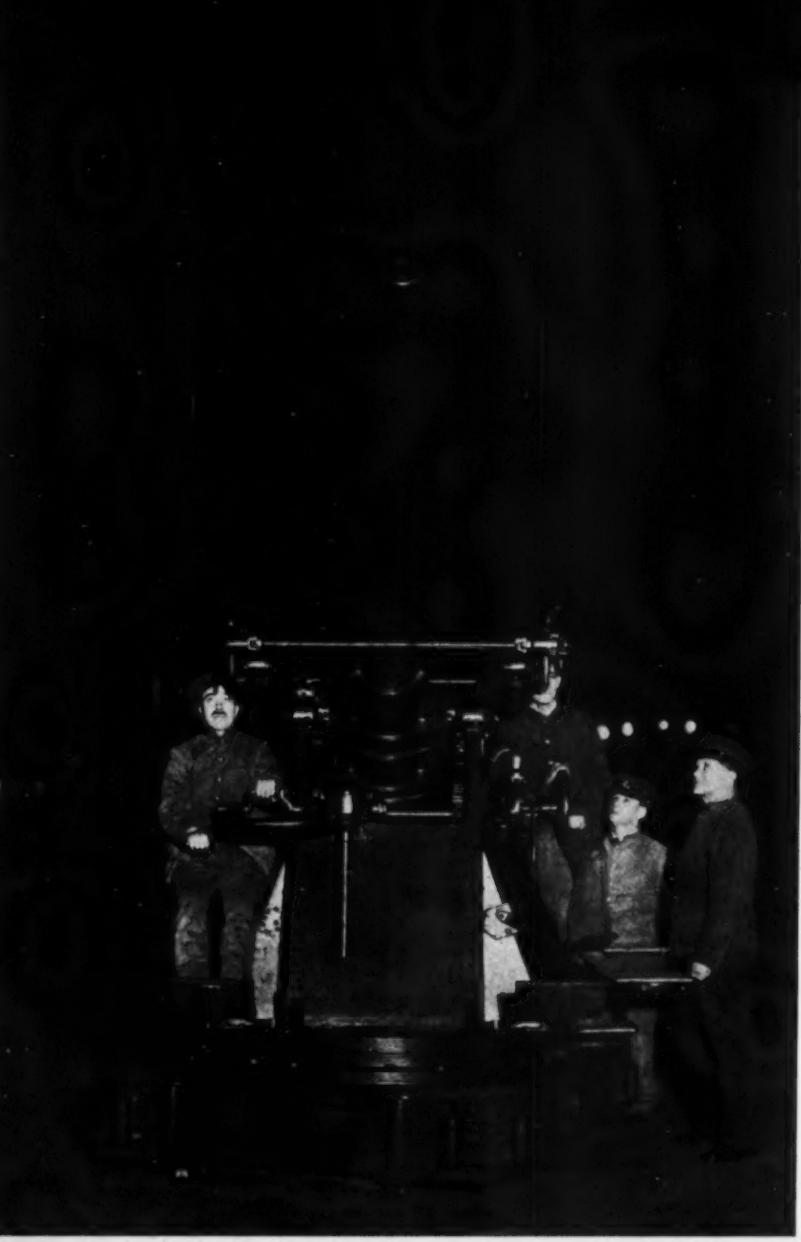
". . . into the breech, dear friends": Gunners of the 51st Anti-Aircraft Brigade, R.A. (T.A.) posting their presents. (*Flight* photograph.)

Yet another great service which the guns can do is to point out day raiders to the fighters. By night that service is performed by the searchlights. Every pilot knows that when he is in the air it is remarkably difficult to spot other aeroplanes in the air. Some individuals—Major Mannock, V.C., was one—have an extraordinary aptitude for spotting other aircraft when flying themselves, but normally it is much easier to spot them from the ground. The defending fighters may not see the raiders themselves, but they can see the shell bursts round them, and then they know what to do. The rest is a matter of speed and shooting straight.

The anti-aircraft guns also come into action against night raiders, as shown in the *Flight* photographs which illustrate this article. In the darkness the gunners, like the fighters, have to depend on the searchlights to point out the raiders. The gunners have no sound-locators, but once the beam of the searchlight has caught a raider no other element of the defence needs anything else in the way of information. The height is found by the instruments, and then fire is opened without delay.

These instruments are wonderful things. The first to come into operation is the height and

range finder. An instrument of this description, by Barr and Stroud, is shown in our illustrations. Three men are needed to work it. It depends on the principle of making a long base between two eyes, so that the angles between the two and the aircraft can be calculated. The obliging instrument simultaneously solves a trigonometrical problem and shows on an indicator the height above the ground at which the aeroplane is flying. The man in charge immediately reports by calling out to the officer in the command post near by, who is watching the aeroplane through binoculars, and he passes it on, with any corrections which he thinks desirable, to the team on the Predictor. Other illustrations show the front and rear faces of the marvellous Vickers Predictor. Given the height and range, this remarkable box sets its thinking machine to work, and calculates how far ahead of the aeroplane the gun must be aimed so that the shell and the raider may reach the same point at the same instant. The fuse in the nose of the shell is naturally set to explode at that instant. The connection between the Predictor and the gun is particularly ingenious. As soon as the instrument is satisfied, the result is electrically transmitted to pointers on dials at the gun, indicating the elevation and direction at



"Archie" turns his nose up: Two views of a 3 in. 20 cwt. gun, on high-angle mounting and semi-mobile platform, at Chelsea. (*Flight* photographs.)

Flight, May 7, 1936

THE NEW FLYING-BOAT WORKS OF

Saunders-Roe Ltd

at

EAST COWES, ISLE OF WIGHT

SAUNDERS-ROE, LIMITED, has grown from foundations out of the old firm of S. E. Saunders, boat builders, established in 1830. In later years the firm became famous for its fast light marine craft, and produced many of the international winners, including the late Sir Henry Segrave's Miss England II.

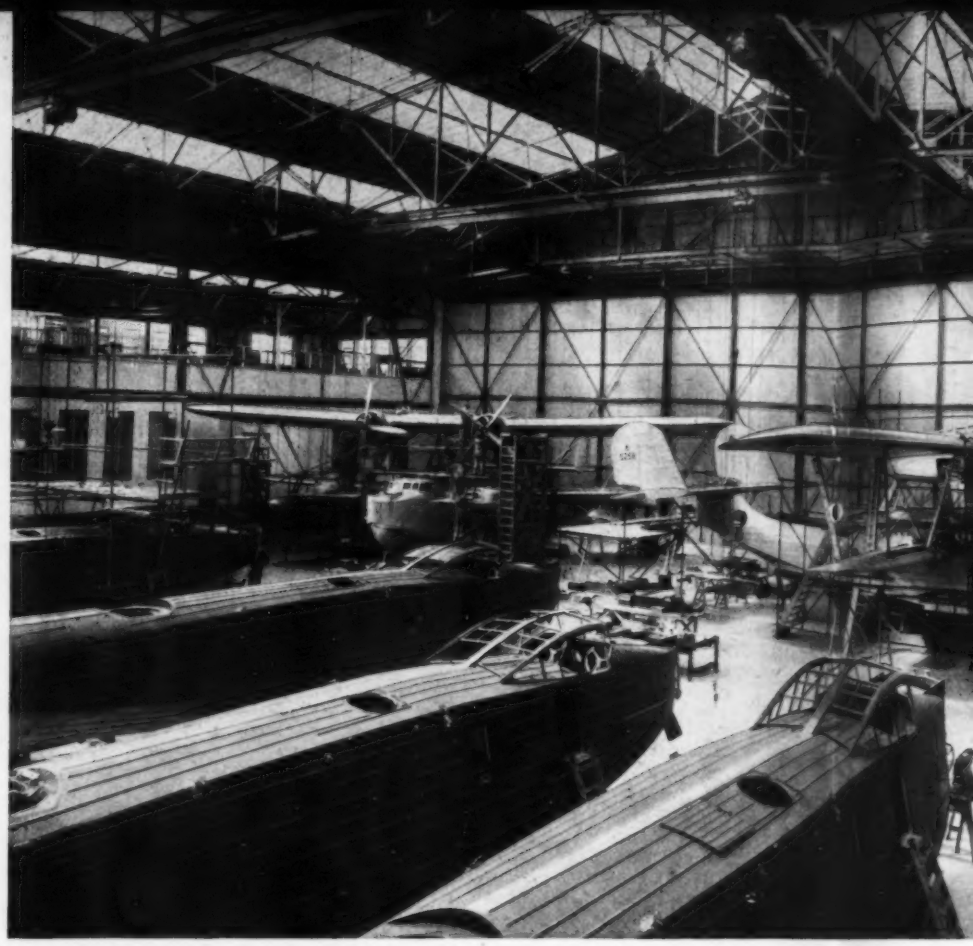
A pioneer in the type of aircraft which in later years has been its speciality, it was in 1912 that a Saunders' hull was fitted to the Sopwith amphibian which was the first successful aircraft in the world of this particular type, and which succeeded in winning the Mortimer-Singer prize for ability to make a series of landings and take-offs from water and land.

Early in 1929 Sir Alliott Verdon-Roe and the late Mr. John Lord joined the company, which was reorganised, and the name changed from S. E. Saunders, Limited, to Saunders-Roe, Limited. Specialising in amphibian aircraft for service and civil use, the Saro Cloud and Cutty Sark were outstanding examples of the firm's products, the former being adopted and is still in use for Royal Air Force training. Concurrent with the production of these amphibians, large type flying boats for R.A.F. use were developed, and in 1931 the Saro A-7 established the first non-stop flight from Gibraltar to Plymouth.

The latest development, known as the "London," is now in use as one of the standard modern flying boats of the R.A.F., and is at present in quantity production for the R.A.F. at the new and enlarged works described in these pages. The programme for these works also embraces extensive research, experimentation and development of new types for future service and civil requirements.

In addition to the aircraft side of the business, Saunders-Roe's shipyard has been modernised in its equipment, and is busily engaged in turning out motor yachts and aircraft marine equipment in the form of seaplane tenders, loading scows and folding boats.

The plywood factory, further up the River Medina, provides the third branch of the firm's activities. Working full time and overtime, this section has taken full advantage of the industrial revival in the use of plywood products.



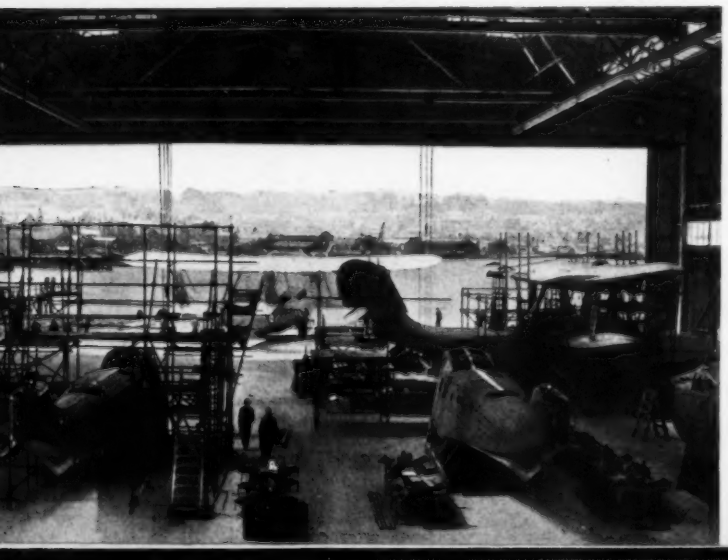
The Main Shop devoted to erection of machines

THE NEW FACTORY is executing an order for the firm's "London" flying boats. The main shop can accommodate 10 to 12 units at one time in various stages. On the ground floor under the East Gallery are assembly fitting operations, mechanical testing department equipped with all modern test instruments. Under the West Gallery are Dope and Covering Shops of ample dimensions for large wing components. On the East Gallery is the sheet metal working department, and liquid fuel and oil tanks, fairings, wing tip floats and stowage fittings in course of manufacture are in evidence. On the West Gallery are accommodated the sewing room, with the latest machines, and also the metal wing assembly. The office block of three floors houses on the first floor the executive offices and the Aeronautical Inspection Bureau. On the ground floor there are the finished part store and the free issue or bonded store. The second floor is devoted to the mould loft, lecture and school room, and the parachute assembly department. The Chief Pilot's office and Pilot's kit room are located in a small building convenient to the slipway. The main erecting shop provides a clear space of 150ft. × 200ft. with a height of 40ft. achieved by means of main roof trusses spaced at 50ft. centres, which support secondary lattice girders and rafters carrying the corrugated asbestos-cement covering. Provision for future extension is made, the main stanchions on one side being designed to support another similar 150ft. span roof. The east, west and south walls are of local bricks harmonising with the surroundings. On the Solent front, a striking elevation is obtained by white cement rendering to the front facade and pylons. The main shop, galleries and office block are lighted both from the roof and sides. The roof lighting consists of plate glass in lead-covered steel frames measuring nearly 50% of the floor area. On the sides the lighting through steel sashes is practically continuous.

THE MAIN ROOF trusses support tracks for electrically operated travelling hoists. The galleries are arranged under lean-to roofs of 30ft. span. On the south side of the main shop the office block, measuring 200ft. × 40ft., is arranged under a single-span roof. An important feature is the door opening of 150ft. clear width, 40ft. height. The six steel-framed sliding doors each weigh five tons; they are provided with hand gearing and are easily moved by one man; the doors are covered with aluminium coloured asbestos protected metal sheeting.

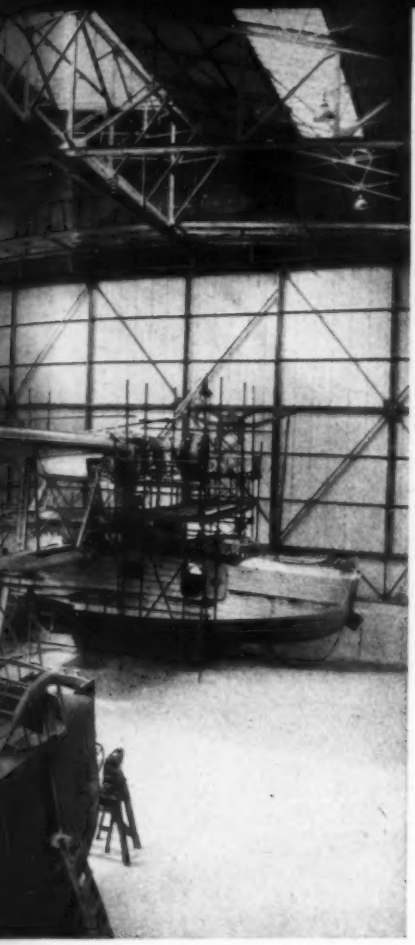
BRITISH STEEL. About 500 tons of steel was used in the building. High tensile steel was made use of in the principal members in order to reduce the deadweight on the foundations. All the steel is of British Manufacture, and the loadings are in accordance with British Standard Specification. Provision has been made in the structure to take care of the severe pressures on the building caused from high south-westerly and north-easterly winter gales. The total load of the building transmitted to the piled foundations by the stanchions is about 2,200 tons. The ground floor load is carried directly on the soil. Long spans and heavy loads made the question of foundations an important one. It was therefore decided to put down a number of bore holes on the site and have recourse, if the results of these holes were found to justify it, to the use of piled foundations. The bores disclosed in all cases a subsoil of varying soft clay growing gradually harder as the depth increased until a rock stratum was found some 30ft. below ground level.

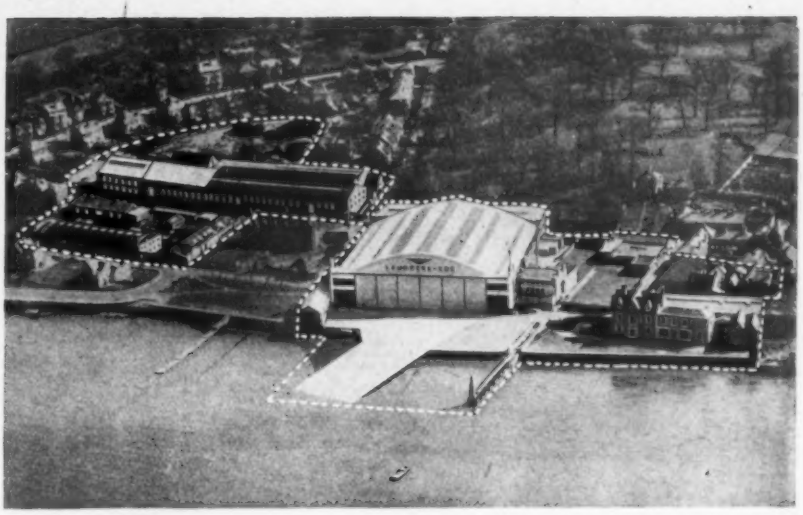
The foundations for the main building consisted of pre-cast reinforced concrete piles of 12in. and 14in. square section varying in length from 26 to 32ft. The heads of the piles were bonded in groups into the reinforced concrete pile caps, which were suitably arranged to take the loads from the steel stanchions. A piled foundation was provided



Looking across the Medina estuary to West Cowes

FLIGHT Photo.





Aerial view showing extent of the Saunders-Roe aircraft establishment

to carry the strongly reinforced concrete beam supporting the tracks of the large sliding doors which form almost the whole of the front of the shed.

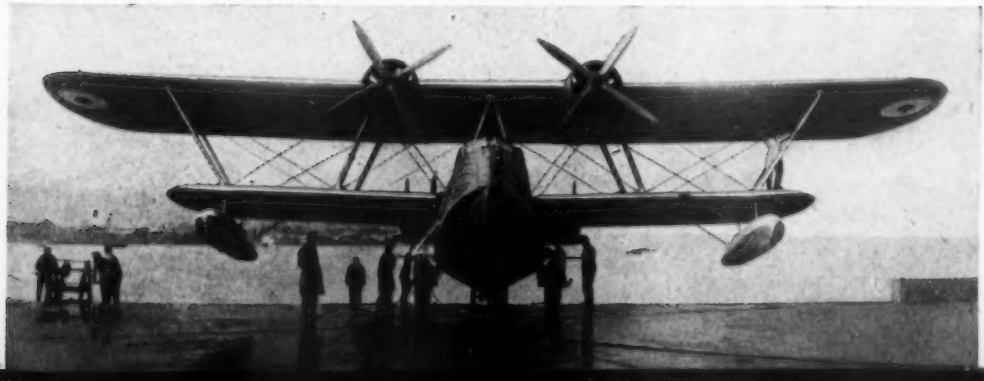
THE SLIPWAY. In the case of the piles for the slipway, as it was not convenient to obtain borings out in the estuary, the determination of the pile lengths was less definite. The piles used were 12in. square section of varying lengths between 22 and 40ft. Provision is made in the slipway for future requirements by a design looking to the use of the slipway by flying boats having a weight of 50 tons and requiring a satisfactory support for a maximum wheel load of 17 tons. The upper portion of the slipway was constructed in situ on the flat slab principle. In order to obtain satisfactory construction and reasonable progress it was necessary to construct the portion below about half tide level with pre-cast units. The heavy load on the decking was taken care of by the use of very large units of approximately 5 tons weight, each interlocking with one another and attached to the tops of the piles by a filling of rapid hardening concrete. The very extensive floor inside the building and the apron leading to the slipway are constructed in reinforced concrete supported on hard core filling. The whole of the floor has been rendered dustless by floor hardening and dustproofing, owing to the vital importance of guarding against concrete dust causing damage to the machines in course of construction. The construction of a new public landing stage, 290ft. long, was included in the works.

HEATING AND VENTILATION of the main erecting shop is effected by means of steam heated floor-type fan heater units, and the heating of the ground and first floor workshops by means of the suspended type. A temperature of 55° F. is maintained throughout the winter. Hot water radiators are fitted in the offices on the accelerated system with a steam calorifier and motor-driven pump. A temperature of 60/65° F. is maintained. The heating and ventilation of the Dope shop is effected strictly in accordance with the Home Office regulations and aircraft requirements. Approximately 2,000,000 cu. ft. of air per hour is drawn over gilled pipe steam heaters and exhausted by means of a large cased type centrifugal fan which discharges the vapours through a flue well above the eaves of the workshop. A temperature of 75° F. is maintained.

PROTECTION AGAINST CORROSION. Owing to the situation on the shore of the Solent, exposed to damp and salty winds from all quarters of the compass, the question of protecting all structural steelwork against corrosion was very important and the most reliable painting was necessary. Two coats of Vigorised red lead primer paint was used on the steel. A top coating of Cerrux paint gave a pleasing finish to the steelwork.

LIGHTING. Osira electric discharge lighting has been installed and has already proved a signal success. The main erecting shop is illuminated by means of 30 units of 400 watts mounted 40ft. above floor level, with a resultant lighting intensity of 7ft. candles on the working plane. The fitting and sheet metal shops are lit by 45 units of 250 watts fitted with diffusing glasses giving a lighting intensity of 8 to 9ft. candles. The lighting of the Dope shop has been treated in a different manner, being directed through the windows from outside by means of angle-type reflectors equipped with 300 watt Osram lamps. In the sewing shop, special diffusing units were installed employing a new technique for lighting this class of work. Flood lighting has been provided for illuminating the apron, also mooring lights to facilitate anchorage.

Contracts were let for the construction at mid-April, and the work was completed at mid-October, 1935.



The first of the new Saro "Londons"

FLIGHT Photo.

A Saro "London" in the huge doorway of the erection shops. Slipway in foreground

CONSULTING ARCHITECT : A. VICTOR HEAL, F.R.I.B.A.
CONSULTING ENGINEER : T. L. BONSTOW, M.Inst. C.E.

CONTRACTORS

BOULTON & PAUL, LTD., Norwich.—Structural steelwork and building.

STURTEVANT ENGINEERING CO., LTD.—Heating and Ventilating.

GENERAL ELECTRIC CO., LTD.—Lighting Equipment.

ALLIANCE ELECTRICAL CO., LTD.—Installation of lighting and power service.

HOLST & CO., LTD.—Reinforced concrete foundations and slipway.

PINCHIN JOHNSON & CO., LTD.—Vigorised red lead primer paint.

CELLON, LTD.—Finishing paint.

HILLS PATENT GLAZING CO., LTD.—Roof lighting.

WILLIAMS & WILLIAMS, LTD.—Metal windows.

ROLLO PRODUCTS, LTD.—Dustproofing and hardening.

Saunders-Roe Ltd

EAST COWES, ISLE OF WIGHT

and

BUSH HOUSE, LONDON, W.C.2

Advt.

Pandora's Box : The Vickers Predictor, which interprets triangles into elevation, traverse and fuse timing (*Flight* photographs.)

which to lay the gun. A second set of pointers on the gun dials are made to synchronise with the first pair by the gunlayers, who elevate and traverse the gun as necessary. If all the calculations are right, *and if* the aeroplane meanwhile continues to fly on a straight and steady course, the result will be a rapid disintegration of that aeroplane, pilot, bomb-aimer and bombs into their chemical compounds.

That is a rough-and-ready description of the work of the 51st (London) Anti-Aircraft Brigade, R.A. (T.A.), whose headquarters are at the Duke of York's Headquarters, Chelsea. It would apply also to the 52nd Brigade, which has its headquarters at the same place. Each Brigade is commanded by a Lieut. Colonel and comprises three Batteries. A Battery is under the command of a Major, and is subdivided into sections (normally two to a Battery). A Battery has also a machine gun section armed with light automatic guns for dealing with raiders which may come down to 3,000 feet or less.

New Equipment

Recruits have lately been coming in much better to the 51st Brigade, and there is no doubt that the issue of up-to-date equipment, together with the restoration of the Territorial bounty to £5, is a stimulating factor. The issue of the new equipment is now in progress. The gun in use is a 3 in. 20-cwt. piece on a high-angle mounting and semi-mobile platform. The loading is done manually, as shown in our illustrations, and the normal rate of fire is one round in 4 seconds. A higher rate can be attained, but more rapid fire does not make for greater accuracy.

There will be great excitement when the new guns arrive at Chelsea, but at present nothing can be said about their characteristics. It is perhaps in anticipation of their arrival, and also by reason of the new equipment and increased bounty already mentioned, that the number of recruits to the 51st Brigade has recently shown a considerable improvement. Nevertheless, it should be made clear that there is room for plenty more, and the idea of helping to defend their homes against air raids is one which ought to make a strong appeal to Londoners. The work is very interesting, but not too strenuous, and the Brigade will accept men between the ages of seventeen (below eighteen years they must have their parents' consent) up to fifty. Gunners, bombadiers and corporals may serve up to the age of fifty-four, and sergeants and warrant officers up to fifty-five. Enlistment in the first place is for four years, which can be extended. After being passed as efficient for twelve years a man is entitled to receive the T.E. medal. There is now one sergeant in the Brigade who served for twenty-one years in the Royal Horse Artillery and earned the Long Service and Good Conduct medal, and has since served for over twelve years in the Territorial Army, and has been granted the T.E. medal. This combination must surely be unique. There is quite a considerable proportion of old regulars in the Brigade. No particular calling is demanded or sought in recruits. All trades are welcome, and

The Robot clairvoyant : Another view of the Predictor.

Peepshow: The Barr and Stroud range finder, which gives height-range by optical triangulation. (*Flight* photograph.)

any intelligent man can be trained to become an efficient anti-aircraft gunner.

All ranks have to attend the annual camp for a fortnight in July every year. For a number of years past the 51st Brigade has had its camp at Watchet, in Somerset, which is conveniently near the R.A.F. summer camp at Weston Zoyland, whence aeroplanes and drogues as targets are supplied, but this year the Brigade is going to Weybourne, near Sheringham, in Norfolk. There is also usually a voluntary camp every Easter. It is during annual camps that the guns fire live shell, and, of course, every gunner enjoys that.

There are two methods of firing. In one case an aeroplane tows a drogue (at the end of a safe length of cable), and ordinary H.E. shell is used to destroy it—the drogue, not the aeroplane—if possible. The other method is for the guns to fire direct at an aeroplane, using reduced propellent charges, so that the burst occurs far below the machine. Firing in this way, one of the officers told me that he once got fifteen effective shots out of sixteen rounds fired. The shooting is not always quite up to that level—if it were, an air raid on London would be an especially parlous affair for the enemy—but it shows that an occasional bull's-eye is not beyond the hopes of the gunners.

METALLISATION

Some Facts About an Ingenious Process

THOUGH the existence of the Metallisation process is now well known, together with the fact that it has applications to aircraft work, the number of directions in which this system can be applied is far larger than the casual observer would imagine.

This statement is prompted by a study of a most informative handbook recently issued by the sponsors of the process, Metallisation, Ltd. In brief, the system makes it possible to spray almost any article with almost any metal or alloy that can be drawn into wire form. Primarily intended for the prevention of corrosion, the process also lends itself to, *inter alia*, decorative work, to the production of electrically conducting surfaces, and to building-up worn metal.

The makers state that although the metal employed is liquified and atomised in the spraying pistol, it reaches the job in a cold state, and can be used even on fabric. The process makes possible the application of coatings of such metals as tin and lead and their alloys; bearing metals; cadmium and its alloys; copper and its alloys, such as brass and bronze; nickel and its alloys, such as nickel chrome (chromium itself cannot be sprayed); iron and steel; and alloy steels.

One of the most popular anti-corrosion coatings is zinc, which finds application in a very large number of industries, but of more interest, perhaps, to the aircraft industry is aluminium coating, while to engine manufacturers particularly the Aluminising process is of the greatest interest; this is a system whereby metal articles can be protected against high-temperature oxidation, up to a temperature of 1,000° C. The coating of aluminium is sprayed on the articles, which are afterwards heat treated. The aluminium coating alloys with the metal of cylinder head, or whatever the job may be, giving an iron-aluminium alloy surface highly resistant to extreme temperatures. Apart from its "internal" uses in high-efficiency engines, the process has proved a very popular one for such items as exhaust collector rings.

To return to the "cold" metal spraying processes, tinning offers a method by which coatings of very widely varying thicknesses may be applied; nickel gives a very hard corrosion-resisting surface; coatings of the copper alloys are particularly useful in electrical work and also lend themselves for decorative purposes; and iron and steel spraying is valuable for filling blow-holes, building up worn parts, etc.

Full details of all these processes are obtainable from Metallisation, Ltd., Pear Tree Lane, Dudley, Worcestershire.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

CHANGES IN TITLE

With effect from May 1, the following changes in title will be made:—

Present title	*New title*
Inland Area	Training Command
Coastal Area	Coastal Command
Central Area	No. 1 (Bomber) Group
Western Area	No. 3 (Bomber) Group
No. 1 Air Defence Group	No. 6 (Auxiliary) Group
Fighting Area	No. 11 (Fighter) Group

DIRECTLY ENTERED AIRMAN PILOTS

As has been announced, a new class of airman pilots entered directly from civil life on short engagements has been introduced to assist in meeting the requirements of the Royal Air Force in pilots during the period of expansion. Details are given below of the conditions of service of these airmen, whose posting to service units commences this month.

Directly entered airman pilots are selected from candidates who have attained the age of 17½ years but have not attained the age of 25 years. The initial engagement is for four years' regular service and six years in the reserve. Extensions of regular service to five years may be permitted at the discretion of the Air Ministry, with a corresponding reduction in the reserve service.

The rank of directly entered airman pilots is regulated by para. 506B of K.R. & A.C.I., which reads as follows:—

"1. Airmen specially enlisted for training as pilots will be classified as leading aircraftmen while under training. On satisfactory completion of training they will be promoted to sergeant but will be strictly on probation until confirmed in rank. They will be eligible for confirmation when they have completed six months' satisfactory probation in the rank. While on probation their position will be junior to that of all other sergeants, but they will take precedence amongst themselves in accordance with the date of their promotion and their order on the passing-out list. On being confirmed in rank they will take precedence amongst other sergeants according to the date of their confirmation.

"2. Should a directly entered airman pilot be not recommended for confirmation at the expiration of the probationary period, the Air Ministry will decide whether that period shall be extended or whether he shall be discharged.

"3. Should a directly entered airman pilot holding the rank of sergeant be reduced below that rank for any cause he will be discharged."

Promotion to rank of sergeant will take effect from the date of qualification as service pilot. The initial rate of pay is 5s. a day, plus flying instructional pay (2s. a day) and, whilst at a civil school, a consolidated allowance of 6s. a day. On promotion to sergeant, pay is at the rate of 11s. 6d. a day, plus the allowances appropriate to that rank, when issuable. Directly entered airman pilots transferred to the reserve after satisfactory completion of their full period of regular service will be paid, in lieu of ordinary service gratuity, a gratuity at the rate of £25 for each completed year of regular service after the first, *e.g.*, an airman transferred to the reserve after completing four years' service will be eligible for a gratuity of £75. Gratuity will not be payable to the estate of an airman who dies or is killed during the period of his regular service in the Royal Air Force.

In other respects, directly entered airman pilots are subject to the same conditions of service as other airmen and airman pilots. They are eligible for consideration for permanent commissions equally with other airman pilots. They will be members of the sergeants' mess but will not hold any office, or vote at meetings, until confirmed in rank. During the probationary period they will not exercise the powers of a sergeant, except such as are necessary for the effective performance of flying duties. C/O.s will, however, arrange for them to obtain experience of other duties under supervision, with a view to their sharing in the normal administrative and disciplinary work of the unit as soon as they are considered capable of doing so.

PERMANENT COMMISSIONS (ACCOUNTANT BRANCH)

The undermentioned warrant officers have been granted permanent commissions in the accountant branch: H. E. J. Acfield and P. J. Holt.

FORMATION OF No. 2 (BOMBER) GROUP

No. 2 (Bomber) Group formed at Abingdon on March 20, and has been placed under the command of the A.O.C.-in-C., Air Defence of Great Britain. The date of taking over executive command of certain stations by No. 2 (Bomber) Group will be notified later.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee was held at Iddesleigh House on Monday, April 20. Mr. W. S. Field was in the chair, and the other members present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Air Comdre. B. C. H. Drew, C.M.G., C.B.E., Group Capt. C. H. K. Edmonds, D.S.O., O.B.E., Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C. The Committee made grants to the amount of £237 10s. The next meeting was fixed for Monday, May 4.

No. 2 FLYING TRAINING SCHOOL

The undermentioned officers and airman pilots have been awarded special assessments on completion of a course of *ab initio* flying training at No. 2 Flying Training School:—

Special Distinction.—A.P./O.s E. L. Hyde, J. G. Spencer, J. Rankin.

Distinguished Pass.—A./Sergts. Harden, R. J., Bushnell, J. N., Gibbs, J. E., Buswell, H. D.

R.F.C. WIRELESS OPERATORS OLD COMRADES ASSOCIATION

The Royal Flying Corps Wireless Operators Old Comrades Association, which has been in existence since 1930, was formed to foster the spirit of comradeship created during the Great War. Reunions are held every second Tuesday in each month, except August, and, in addition, visits to places of interest are arranged. The annual dinner is held in London in October. Membership is open to all those who served as wireless operators in the Royal Flying Corps and in the Royal Air Force up to 1919. Full particulars can be obtained from the Hon. Secretary at 56, Regency Street, London, S.W.1.

R.A.F. STAFF COLLEGE EXAMINATION

The following officers passed the R.A.F. Staff College Qualifying Examination, which was held in January, 1936. Selection of officers to attend the next Staff College Course will shortly be made from these officers and from those who previously qualified and are still eligible:—

ROYAL AIR FORCE

Flight Lieutenants:—Addams, J. R., Atcherley, R. L. R., The Earl of Bandon, Bellairs, E. H., Brown, Robert, B. (Stores Branch), Butler, H. J. (Stores Branch), Buxton, G. M., Cator, F. G., Cheshire, W. G., Coggle, C. K. J., Combe, A. R., Cooper, R. J., Cozens, H. I., Dickens, L. W., Dickens, T. C., Ewens, F. G. H., Fagan, T. P. P. F., Freeston, H. E. (Stores Branch), Freestone, L. R. S., Grace, C. F. H., Groves, H. M., Hancock, C. R., Hawtrey, J. G., Head, T. A. (Stores Branch), Holmes, W. T., Hopkins, E. D. MacL., Hunt, A. W., Jordan, R. B., Loughnan, G. H., Lywood, G. E. G., McDonald, A. W. B., McEvoy, T. N., Macfadyen, D., Macpherson, G. F., May, F. M. V., Mellor, H. M., Montgomery, A. H., Mutch, J. R., Northway, E. G. (Stores Branch), Norwood, J., Nutt, F. E., Pankhurst, L. T., Pearce, N. A., Pharazyn, W. F., Philpott, M. G., Pike, T. G., Sealy, C. F., Sharp, A. C. H., Smith, E. F. (Stores Branch), Storrar, R. C. (Stores Branch), Swain, F. R. D., Taylor, L. (Stores Branch), Tyzack, J. E. V. (Stores Branch), Wallis, J. B. M., Wheeler, A. H., Wisher, H. G., Wood, W. G. S. (Stores Branch), Yarde, B. C.

Flying Officer:—Read, F. C. (Stores Branch).

The following Dominions officers also passed the examination:—

ROYAL AUSTRALIAN AIR FORCE

Flight Lieutenants:—Charlesworth, A. M., Fleming, J. R., Hancock, V. E., Robinson, G. M. J., Seekamp, H. B.

ROYAL CANADIAN AIR FORCE

Flight Lieutenants:—Brown, W. W., Costello, M., Slemon, C. R.

ROYAL AIR FORCE GAZETTE

London Gazette, April 28, 1936

General Duties Branch

The following Flying Officers are promoted to the rank of Flight Lieutenant:—R. J. W. Barnett (R.A.F.O.) (February 1); D. A. Gibson (April 27).

P/O. K. J. McKay is promoted to the rank of Flying Officer (March 14).

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation (March 15):—S. Hook, J. F. Walker.

F/O. D. G. Lewis is restored to full pay from half pay (April 18); Lt. Cdr. A. P. Colthurst, R.N., Sqn. Ldr., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (April 5). The short service commission of Acting Pilot Officer on probation H. G. L. A. Brooking is terminated on cessation of duty (April 10).

Accountant Branch

Sqn. Ldr. A. R. Thomas is placed on the retired list (April 27).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

Flt. Lt. H. J. Adkins (R.A.F., retired) is granted a commission as Flight Lieutenant in Class C (October 7, 1935); F/O. J. W. Caddy (R.A.F., retired) is granted a commission as Flight Lieutenant in Class C (February 10); H. T. R. Cripps is granted a commission as Flight Lieutenant in Class C (March 23); T. J. Shaw is granted a commission as Flying Officer in Class C (April 8).

The following Class E reservists are granted commissions as Pilot Officers on probation in Class A (April 4):—335699 Sgt. E. Goldsmith; 157333 Sergt. G. E. Lowdell, A.F.M.; 334789 Sergt. A. R. O. McMillan; 347376 Sergt. W. L. B. Palmer.

700041 Sergt. W. J. Alington, Class F reserve, is granted a commission as Pilot Officer on probation in Class AA(i) (April 4); F/O. H. J. Padfield is transferred from Class A to Class B (March 13).

The following are transferred from Class A to Class C:—Flt. Lt. F. W. M. Downer (April 28); F/O. R. A. Dimsdale (July 25, 1935).

P/O. B. E. A. Pollard-Urquhart is transferred from Class C to Class AA(ii) (March 19); Flt. Lt. C. Jackson relinquishes his commission on account of ill-health and is permitted to retain his rank (April 29); F/O. J. C. Boulter relinquishes his commission on appointment to a short service commission in the Royal Air Force (April 6).

Erratum

In the *Gazette* of April 7. *For* Charles William Staveley, *read* John Charles William Staveley

AUXILIARY AIR FORCE

General Duties Branch

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—Sqn. Ldr. J. A. C. Wright, A.F.C., T.D., D.L., relinquishes his commission and command of the squadron on completion of service (March 1).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

J. A. C. Wright, A.F.C., T.D., D.L., is granted a commission as Squadron Leader in Class C (March 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—H. R. McL. Reid, D.F.C., to No. 5 (Army Co-operation) Squadron, Chaklala, India; to command vice Wing Cdr. P. F. Fullard, D.S.O., M.C., A.F.C., 25.2.36. C. K. Chandler, M.B.E., to Signals Branch, Dept. of C.A.S., Air Ministry, 9.4.36. R. H. Hanmer, M.C., to D. of P., Dept. of A.M.P., Air Ministry, vice Sqn Ldr. N. P. Dixon, A.F.C., 10.4.36. S. Graham, M.C., to No. 7 (B) Squadron, Worthy Down; for flying duties, 15.4.36. W. E. Staton, M.C., D.F.C., to No. 3 Flying Training School, Grantham; for Administrative duties vice Sqn. Ldr. R. J. Brownell, M.C., M.M. (R.A.A.F.), 20.4.36.

Flight Lieutenants.—W. R. Wills-Sandford, to Aircraft Depot, Hinaidi, Iraq, 31.3.36. A. H. Garland, to No. 5 (Army Co-operation) Squadron, Chaklala, India, 19.2.36. E. S. Burns, to No. 8 Flying Training School, Montrose, 18.4.36. B. T. Shelley, to Headquarters, R.A.F., Iraq, Hinaidi, 18.4.36.

Flying Officers.—R. F. Smith, to No. 5 (Army Co-operation) Squadron, Chaklala, India, 24.2.36. R. C. Richmond, to Headquarters, R.A.F., Iraq, Hinaidi, 31.3.36. P. J. A. Riddell, to Headquarters, R.A.F., India, New Delhi, 4.3.36. K. Lea-Cox, to No. 57 (B) Squadron, Upper Heyford, 15.4.36. W. F. C. Hobson, to Aircraft Depot, Karachi, India, 14.3.36. G. E. Jackson, to No. 5 (Army Co-operation) Squadron, Chaklala, India, 14.3.36.

Pilot Officers.—C. C. Byar, to No. 48 (G.R.) Squadron, Manston, 16.4.36. A. G. G. Baird, M. P. C. Corkery, T. S. Jameson, to No. 11 (B) Squadron, Risalpur, India, 14.3.36. A. G. Dudgeon, W. L. Rowbottom, to No. 11 (B) Squadron, Risalpur, India, 18.3.36. J. B. Black, to No. 20 (Army Co-operation) Squadron, Peshawar, India, 14.3.36. R. M. Coad, A. N. Cole, to No. 20 (Army Co-operation) Squadron, Peshawar, India, 18.3.36. J. Darwen, E. K. Piercy, to No. 27 (B) Squadron, Kohat, India, 14.3.36. A. S. Downes, J. C. Millar, E. T. T. Nelson, P. H. R. Saunders, to No. 28 (Army Co-operation) Squadron, Ambala, India, 14.3.36. J. P. Marriott, to No. 28 (Army Co-operation) Squadron, Ambala, India, 18.3.36. R. N. Cook, K. M. M. Wasse, to No. 31 (Army Co-operation) Squadron, Karachi, India, 14.3.36. R. P. Widdowson, to No. 31 (Army Co-operation) Squadron, Karachi, India, 18.3.36. G. Elsmie, M. M. Kane, to No. 39 (B) Squadron, Risalpur, India, 14.3.36. R. H. S. King, to No. 39 (B) Squadron, Risalpur, India, 19.3.36. J. R. Maling, F. L. Newall, to No. 60 (B) Squadron, Kohat, India, 14.3.36. F. R. Foster, W. R. Selkirk, to No. 60 (B) Squadron, Kohat, India, 18.3.36.

Acting Pilot Officers.—R. L. Lorimer and J. P. S. Packer, to No. 9 Flying Training School, Thornaby, 15.4.36. D. M. Barrett, to No. 9 (B) Squadron, Aldergrove, 17.4.36.

Stores Branch

Wing Commander.—E. M. Cashmore, to Headquarters, R.A.F., Iraq, Hinaidi; for Equipment Stores (Supplies) Staff duties, 9.4.36.

Flight Lieutenant.—H. W. Penney, to Headquarters, R.A.F., Far East Command, Singapore, 18.4.36.

Flying Officer.—H. M. C. Harwood, to Aircraft Depot, Hinaidi, Iraq, 31.3.36.

Medical Branch

Flying Officer.—P. A. Cooper, to Aircraft Park, Lahore, India, 9.4.36.

Commissioned Signals Officer

Flying Officer.—A. W. Coe, to R.A.F. Station, Tangmere; on appointment to a permanent commission as Flying Officer (Commissioned Signals Officer) on probation, 16.4.36.

Commissioned Engineer Officer

Flying Officer.—C. T. McKnight, to Marine Aircraft Experimental Establishment, Felixstowe; on appointment to a permanent commission as Flying Officer (Commissioned Engineer Officer) on probation, 22.4.36.

Chaplains Branch

Revd. A. R. J. Symes, to R.A.F. Station, Gosport; for duty as Chaplain (C. of E.) on appointment to a short service commission, 12.3.36.

"POUX" IN THE SHIRES

LEICESTERSHIRE Flying Pou Club, which was founded last October, made its first real hop into the limelight on Saturday and Sunday, when it organised a rally at its aerodrome at Sandy Lane, Melton Mowbray. For a first venture of a club a little more than six months old the gathering was a distinct success. The club's *Pou-du-Ciel* was on view, but the non-delivery of the engine kept it on the ground.

Mr. Stephen Appleby showed members what his own machine would do and, as usual, he handled it with amazing skill.

An outstanding feature of the meeting was the arrival of Mr. Bernard Collins from Heston in a Puttnam Pou; led by Mr. Edmunds in a Leopard Moth (with its air brakes on), he had accomplished the 102 miles (there were certain deviations) without trouble in an hour and three-quarters.

Several other aircraft joined in. Mr. W. Lindsay Everard, M.P. for Melton who has consented to become president of the Club, flew over in his Leopard Moth, and there were machines from the Leicestershire and Staffordshire Clubs, in addition to a D.H. Dragon of Crilly Airways.

A second club *Pou* is being erected and five others are being built by individual members. A hangar capable of holding all these machines has been put up at the aerodrome at a cost of about £100

Mr. Everard, with whom was Mr. A. M. Lyons, K.C., M.P. for East Leicester, was so impressed by the progress the club had made that he offered to buy them a B.A.C. Drone—the second machine he has given to Leicestershire enthusiasts in a week.

Herr Kronfeld has promised to go to Melton on a number of week-ends to give members some tuition on his ground training machine before they take the Drone into the air.

AERODROME CONTROL

G.A.P.A.N. Discuss Some of the Problems : Rates, Rents and Radio

THAT aerodrome owners might consider the advisability of increasing their revenue by entering the entertainment field was a suggestion put forward by Air Commodore E. D. M. Robertson at an informal dinner of the Guild of Air Pilots and Air Navigators at the Royal Aero Club last week. The suggestion has been made before, and it is quite conceivable that some day it may be adopted. Among the particular company to which Air Commodore Robertson was speaking, however, it is doubtful if the suggestion met with very much approval.

Air Commodore Robertson, who is Chief Aerodrome Officer at Croydon Airport, was the principal speaker at the dinner, and was introduced by the Rt. Hon. Capt. F. E. Guest, C.B.E., D.S.O., who is Master of the G.A.P.A.N. Air Commodore Robertson referred to the expenses and income accounts of running an airport. One item was the wages bill, which was large, and maintenance of the airport was expensive. It was also necessary to allow for obsolescence, and usually there were heavy rates to be paid to the local authorities. The income from an airport had to come from rents, landing and housing fees. At the present time, he said, is was definitely not possible to balance the budget at Croydon, although it was often said that the rents and various charges were too high.

Bye-Laws Needed

With reference to the rules in force, the lecturer pointed out that although it was necessary to let the renters get on with their work unhindered, property had to be protected, and he thought that an airport ought to have bye-laws which it could enforce in case of real need. Concerning the smooth and efficient working of an airport, a good communications office was a great help, and if well organised would help to save a lot of time.

In the matter of control of aircraft in the air, he thought that the present arrangement, whereby both local control and a control along the routes were at the airport, would probably be modified. It seemed likely that the control of aircraft along the routes would be removed from the control tower to a separate part of the buildings where the work could be carried on in quiet and comfort. Three big problems at present had to be faced: wireless congestion, some mean of rapidly plotting the position of aircraft, including their height, and effective landing beacons.

Major R. H. S. Mealing, chief technical assistant in the civil aviation department, paid a tribute to the work done by the G.A.P.A.N. The Guild had done a great deal to help civil aviation and to help the Air Ministry to administer civil aviation. A few years ago anyone could instruct in flying. By handing the control of instructors' licences over to the Guild a system had been established, and was now working, which was the envy, he would not say of the world, but of a large portion of it.

Turning to the subject of control, Major Mealing asked where all this control was leading, and where it was going to end. What was troubling them was to decide which system they should have. They could have the canalisation system suggested by Major Thornton, which did enable them to know where their aircraft were, but resulted in bringing a large number of aircraft close together in a comparatively small space. An alternative system was known as strata control. In this latter, aircraft on different courses would be flying at different heights. One could imagine machines flying below 2,000ft. to be free of restrictions. One could also imagine commercial aircraft flying between 2,000 and 6,000ft. being assisted by every known means. He would point out that the growth of the R.A.F. introduced yet another factor, as R.A.F. machines on their lawful occasions would have to be reckoned with in any system adopted. It is were asked what was going to be the solution, he would have to reply that he did not know.

With reference to the future, he thought civil aviation at home would have to be administered not by the Air Ministry, but by a separate body. The people immediately interested were the operators and the aerodrome owners, and it would seem logical that they should set up this body and run it. He deplored the analogy often used in this connection, of Trinity House in its relation to shipping. There was no analogy. As regards paying, he suggested that they might try to get a rebate on the petrol tax and to use the money thus saved.

Mr. Norman Blackburn, who is a warden of the Guild, said he was a little disappointed at the turn the speeches had taken. He had hoped to hear something about the Guild and the aviation profession. He did not suggest that the Guild should become a trade union, but he thought it should study how professional pilots could look after each other. He had been astonished at the apathy of many professional aviators towards the Guild. He looked on the organisation as a means for fortunate pilots to help those less fortunate, and he pleaded very earnestly for all professional pilots to support the Guild.

Mr. Collins did not agree with the canalisation system, as he thought it tended to restrict the freedom of the air. He hoped that examinations would not be made easier, as the present standard was their pride and the envy of the world.

Mr. Jeffs referred to the growing need of control, but admitted he did not know what system was likely to prove the best.

Capt. E. W. Percival said he had now degenerated from a professional pilot into a designer and constructor, and he thought that, as regards safety in the air, it was now up to the designers to produce the best possible view and to put in their machines as good equipment as it was possible to obtain.

Runways

Flt. Lt. R. C. Preston referred humorously to the confusion which arose at the first G.A.P.A.N. display. He asked whether it was not possible to have the runways at an airport arranged in quadrants so that take-off and landing could be carried out independently in different parts of the aerodrome.

Capt. A. S. Wilcockson was very much against private aircraft being admitted at commercial airports, and referred to the fact that large aeroplanes carrying anything from ten to forty passengers were at present at the mercy of any small machine which blundered into a place like Croydon.

Mr. L. F. Payne, airport officer at Southampton, pointed out some of the difficulties of strata flying, one being that the machines which flew in the 2,000 to 6,000ft. layer had to come down to the 0 to 2,000ft. layer at some time or other.

In reply to the discussion, Air Comdre. Robertson said the question of runways raised by Flt. Lt. Preston was all a question of £ s. d. He thought that at a commercial airport one should not be expected to admit an *ab initio* school, but it was difficult to refuse joy-riding concerns which, after all, might do a great deal of good in the way of introducing passengers.

In bringing the evening to a close, Capt. Guest urged that the Treasury should support civil aviation much more strongly than it was at present doing, and he suggested that the best direction in which Government money could be spent was on ground organisation.

ROYAL AERO CLUB OFFICIAL NOTICES.

King's Cup Air Race, July 10-11.—Intending competitors are reminded that entries close to-morrow, May 8. Regulations and entry forms can be obtained on application to the Royal Aero Club, 119, Piccadilly, London, W.1.

* * *

Continental Events.—The Club has received invitations for British private air tourists to take part in the following:

Whitsun Flight through Austria, Hungary and Switzerland, May 27-June 4.

Marseilles Week-end.—May 30-June 1.

Stockholm Air Display.—May 23-25, in connection with the Stockholm Aero Exhibition.

Third Magyar Pilota Picnic, Budapest.—June 13-19.

Full particulars of these events can be obtained from the Club.

* * *

Award of the Britannia Trophy.—The committee has awarded the Britannia Trophy for the year 1935 to Miss Jean Batten in recognition of her flight across the Southern Atlantic on November 12-13, 1935, in a Percival Gull.

HAROLD E. PERRIN, Secretary.

Private Flying

Topics of the Day

Not So Expensive

FROM time to time the amateur pilot is subjected to a barrage of questions by the uninitiated, and almost invariably one of the leading enquiries concerns the costs of instruction and of hiring machines. When the figures of, say, 30s. and £2 are mentioned, the more innocent person has to be carried off in a fainting state, even though it may have been firmly stated that these figures apply to an *hour's* flying, during which the earnest pilot may have travelled a matter of a hundred miles or more.

Now I am not going to pretend that flying is cheap, but I do claim that, once the initial period of training has been passed, it is not half as expensive as some people appear to imagine. There are days when an aeroplane is much less useful for long-distance travel than a pair of roller-skates or the now defunct pogo stick; but, on the other hand, if one's days are carefully chosen, a very considerable distance can be covered at very reasonable cost.

Some Comparisons

VERY few people can afford to own an aeroplane, but a vastly greater number can afford to hire one either from a club or from a firm which specialises in the hiring business. I am, therefore, taking the cost of hiring and comparing this with the cost of owning and running a car for a fair distance during the year. Only thus can a fair comparison be made.

Let us take a 10 h.p. car costing about £250 and driven for a matter of 10,000 miles during the year. Depreciation will be about £80 in these hard times—not including the loss involved in wing damage by careless garage hands!—fuel and oil will cost £30; insurance will cost £10; and garage in a less expensive part of London or of any other big town something like £15. The total is £135, and this works out at 3.24d. a mile.

I know of several clubs where good and suitable machines can be hired for an inclusive charge of 30s. an hour, during which a distance of a hundred miles or more will have been covered. The cost, therefore, is 3.6d. a mile. If a machine is hired at £5 a day, including insurance, but excluding fuel and oil, one may take it that some six hours' flying will be done. Fuel and oil will cost £3 6s., and the total—less landing fees, which are an incalculable sum just now—will be £8 6s. Rather less than 28s. an hour, and, at a hundred miles an hour, a matter of 3.32d. a mile!

I shall be accused of cheating, but I am not forgetting that the cost of learning to fly properly will be something like £100, nor that one may make all the necessary arrangements only to find that Q.B.I. is in force at the aerodrome of departure. On the other hand, the pilot covers his distances in a very much shorter time, and these distances are very much less than they are in the case of the car driver, who must make vast detours in order to avoid estuaries and the like.

Compass Swinging Extraordinary

DURING quite a number of years' flying a private-owner friend of mine has discovered yet another use for that extremely valuable device—the small bearing compass.

During a flight the corrector box fell off his compass, and some idiot grabbed it and opened it, dropping out the bar magnets. He popped them back and closed up the box, after which the owner refixed it to the compass.

On the way home his compass course appeared to be very much out, but, knowing the landmarks, he was not very troubled.

However, he found that only one bar magnet had been replaced properly, and that the other had been put back the wrong way round. This meant reswinging the machine, but there was no compass base available.

Fortunately, he thought of his bearing compass, and set the machine up on a trestle facing as nearly east and west as possible. Then he lay on the ground and took the bearing of a couple of plumb bobs hanging from the airscrew and from the rudder post, having the machine pulled sideways until these bobs were dead east and west by the bearing compass. On examining the compass on the machine, the deviation of this bearing could be seen. The same, of course, applied to bearings on the other points of the compass, and so he was able to do the job.

A Useful Adjunct

WITH a bearing compass one can make a "compass base" of very large diameter—in this case about a hundred feet—so that any error is very small indeed. Many people possess these bearing compasses, as every infantry officer used one during the war.

By means of the scheme which has been outlined, a private owner can check his compass and make out his own deviation card without the need for a compass base, on which, incidentally, it is difficult to handle a machine. When using this, directly the tail is slightly moved, bringing it over the compass bearing, the nose is swung to the other side of the reciprocal bearing, and one feels that the wheels should be put on casters so that they can be moved sideways to bring the front plumb bob accurately into position without disturbing the other one.

Using a bearing compass, one moves the compass to suit the position of the machine, and it is only necessary to adjust the rear end to get the two plumb bobs dead in line with the compass.

Which reminds me that I heard the other day of a "B" licence pilot who did not know that there were any magnets in a compass!

INDICATOR.

FROM the CLUBS

Events and Activity at the Clubs and Schools

LONDON

THE flying returns of the London Aeroplane Club showed 144 hr. 15 min. last week. Messrs. E. Young, M. MacIntosh, E. L. Currey, and J. D. Brooke became members.

NORFOLK AND NORWICH

Last week's flying time passed the thirty-hour mark. Mr. G. E. Greig has become a pupil.

WITNEY AND OXFORD

A demonstration of the *Pou-du-Ciel* is scheduled for May 30 and June 1. Twenty-eight hours' flying was recorded last week. The total for April was ninety hours.

LIVERPOOL

Despite the disappointing weather during April the total flying time for that month was 228 hr. 30 min. The figure for last week was 78 hr. 45 min. There will be an informal dance in the Hooton clubhouse on May 9 at 8 p.m.

MIDLAND

New flying members are Dr. Henderson and Mr. J. C. Turnill. Mr. E. Turner has gone solo and Mr. J. Jackson has completed his "A" licence test. Sixteen hours' dual and thirty-four hours' solo were logged during the week ending May 1.

REDHILL

Six machines attended the Shoreham Dawn Patrol. Mr. Maxwell-Stimson has gone solo on the Autogiro. Eight new members joined the club last week. The Club Autogiro was used for filming the Cup Final. Flying time for the week ending Friday, May 1, amounted to 88 hr. 25 min.

YORKSHIRE

Club machines flew 67 hr. 10 min. last week and a total of 144 hr. 25 min. during April. Mr. E. L. Ashworth became a flying member Mr. J. A. Chorlton a country member, Mr. R. Walker rejoined as a flying member, and Mr. C. M. Blow joined the Aviation Group. Mr. R. E. Sharples has bought a B.A.C. drone. Mr. H. F. Boskill has made several successful flights at Yeadon in his *Pou*.

CINQUE PORTS

High winds and low clouds kept last week's flying times down to forty-eight hours. Mrs. B. S. Macdonald, who is taking a "B" licence, attended at the Air Ministry last Wednesday week for the first of her technical examinations and acquitted herself with honour. Mr. George Seversky was flown back to Paris by Mr. W. E. Davis. New members are Miss M. M. Close, Mrs. G. M. Howey and Mr. Rainey. Mr. Robins, another new member, has joined to take an instructor's course. Having accepted the agency for the Aeronca for Kent, Sussex and Surrey, the club is now in possession of its demonstration model, which Mr. Brown, the chief instructor, flew from Hanworth.

BRISTOL AND WESSEX

Bristol's first *Pou-du-Ciel*, made by Mr. H. J. Dolman, took the air on Saturday. After several short hops it turned over on its back without injury to Mr. Dolman. Flying times for last week totalled 66 hr. 35 min. and for April 130 hr. 10 min.

PORTSMOUTH

For the week ending May 1 the flying time was thirty-nine hours and the monthly total 104 hr. 35 min. New members were Messrs. A. C. A. Allen, T. B. Birkett and Lt. Dennis Sanderson, R.N., Lt.-Cdr. R. L. Fisher, R.N., has passed his "A" licence tests.

WEST MALLING

Three machines went to Shoreham for the last Dawn Patrol. The flying time for April was 90 hr. 40 min. Tests for the "A" licence were made by Mr. D. A. Doughty and Mr. R. S. K. Hidkmott went solo. New members include Mr. N. Greenslade, Mr. A. M. Campbell, Mr. and Mrs. D. R. Pobjoy, and Mr. L. de V. Bottomley.

READING

Last week's flying time was 43 hr. Mr. Cowlands became a pupil and Lt. Curme went solo. At the Shoreham Dawn Patrol last Sunday week Mr. K. Vashanathi, with Mr. Cowlands as passenger, was the only one to qualify for a free breakfast. Mr. and Mrs. Atkey have taken delivery of their new de Luxe Hawk Major. Last week's flying total was forty-three hours.

New pupils last week were Messrs. Cowland, Palmer and Sharples. Mr. Curme went solo. The flying time last week, during which Mr. and Mrs. Atkey left for Paris in their new Hawk Major, was 31 hr.

CAMBRIDGE

For the fortnight ending May 2 flying times at Marshall's Flying School, Ltd., totalled 280 hours. First solos were made by Messrs. Carver, Miller, Gerard, Elton and Norbury. Miss Cawood and Messrs. Kirkwood, Saint, and Winton-Smith passed their "A" licence test. New members were the Hon. McClintock Bunbury, and Messrs. Massey, Luddington, Gunton, Nordink, Koning, Watkins, Shinner, Aitkin, Thompson, and Hutchinson. Four members are training for their "B" licences and instructors' certificates. Flying times for the week April 26 to May 2 totalled 171 hr. 35 min., constituting a record for one week at the Flying School.

CROYDON

Since Atlas Air Services, Ltd., started their flying school at Croydon the weather has not been kind to them, but during April they put in fifty-one hours' flying, the majority being dual instruction. At the moment they have thirty-two pupils on their books for the "A" licence and three are following up for their "B's." Mr. Hamblin, of British Continental Airways, Ltd., has completed the tests for his "A" licence, and Mr. Williamson is about to go solo. Owing to the restrictions at Croydon the company has arranged for landings and tests to be made at another aerodrome. Miss D. Moore, who has started taking instruction, is a cousin of the late Miss Winifred Spooner.

A MODERN LAYOUT: The "circulatory" traffic arrangements planned for Gatwick can be visualised in this aerial view taken by a *Flight* photographer. Private owners will be encouraged there in due course and lock-ups (which can be seen nearest the station, on the right) will be provided for them. Those who knew Gatwick of old will see that all the buildings are laid out on the new southern extension.

Private Flying

YAPTON

April's flying time at Yapton was sixty-nine hours, of which 30 hr. 40 min. was flown during the last week. New flying members are Messrs. W. E. Holland, J. Heath, Swift Coleman, Ernle Clark, D. Atkinson, J. K. Grosvenor-Monro. Mr. Holland is taking the "B" licence. First solos have been made by Miss Marshall and Messrs. Holland, Heath, Simons and Lindsley. Miss Marshall and Messrs. Holland, Lindsley and Simons have passed their "A" licence tests. The Aeronca was demonstrated at the Club on April 26.

BORDER

The weather was so bad last week that it was hardly safe to take the machines out of the hangar. Mr. Harold Carr, the President of the Border Flying Club, is entertaining the members and officials of the Aerodrome Committee of Carlisle Corporation to a flight to Isle of Man, Belfast, and Prestwick, in Scotland, on May 7. The party is being conveyed in two D.H.89's of Railway Air Services, Ltd., and the Eagle belonging to the Border Flying Club. The party is being entertained to lunch by the Lord Mayor of Belfast.

HANWORTH

Sir Charles French has bought a Moth and is housing it in the Club hangar. Mr. Peckham, of the staff flying club, has gone solo, and Messrs. Robertson, Parker and Burroughs have become members. The two latter are members of the National League of Airmen. The club sent four machines to the Shoreham Dawn Patrol. There will be another Dawn Patrol at Hanworth on Sunday, May 10. Last week's flying times totalled 75 hr. 35 min. The week's big event, of course, was the demonstration by Mr. Clem Sohn, which was witnessed by about 50,000 people.

HASTINGS

The Mayor of Hastings, Councillor E. M. Ford, stated at the dinner of the Electricity Department Social Club, that the members would think about a flying club, so as to be ready to occupy the new aerodrome when it is opened next year. The suggestion has already been acted upon—the Hastings Flying Club has been formed. The club intends to make flying as cheap as possible and is not out to make a profit. The subscriptions are: Flying members two guineas, non-flying members one guinea. The Mayor, as originator of the idea, has been elected president. The management committee is: Chairman, Mr. Cyril Llewellyn Rees; vice-chairman, Mr. R. A. Dunkley; hon. secretary, Mr. A. R. Hibell; assistant hon. secretary, Mr. D. H. Wilkins; hon. treasurer, Mr. T. Hales; and Messrs. E. L. Tapson and G. Tanner.

C.A.S.C.

The Corps has now flown over 500 hours. Last week-end members flew 6 hr. 5 min. solo and 3 hr. 20 min. dual. Mr. J. E. Lush passed his "A" licence tests and Mr. A. Robertson has joined the R.A.F.

NEWCASTLE-ON-TYNE

The total flying time at Newcastle for week ending May 3 was 64 hr. 30 minutes. Messrs. G. Fairbairn and M. R. Atkinson went solo, while Mr. W. Thompson, an Air League pupil, did his "A" licence tests. The annual Rugby match between the local Auxiliary Squadron (No. 607) and the Newcastle Aero Club was played at Woolsington, and resulted in the narrow defeat of the Club.

COVENTRY

It was announced in *Flight* of February 13 this year that the Coventry Aviation Group and the Coventry Aero Club had amalgamated under the name of the Coventry Aeroplane Club. Mr. P. Haselock, of 25, Wainbody Avenue, Coventry, is the secretary, and it is now learnt that the Club has bought a Pobjoy Swallow.

The hangar is now outside Whitley Aerodrome and the clubhouse will be adjoining. There are two honorary instructors, Messrs. R. S. Higgins and C. Kenney, and the Club now has a full-time G.E. This Club, incidentally, was not included in the list published in the special light aircraft number of *Flight* published on April 23.

KARACHI

The flying time for March was 244 hr. 45 min. Five members are expected to qualify for their "A" licences in the near future. More than 17 hr. night flying have been recorded. A member reports that from 4,000 ft. the beacon at Hyderabad—more than eighty miles away—is clearly visible. The Club placed a Leopard Moth at the disposal of the Director of Civil Aviation, who in company with certain Government officials visited Karachi at the end of the month. The pilot instructor took them up at night in order to demonstrate the lighting of the airport.

BROOKLANDS

The extra hour's daylight and the change for the better in the weather has resulted in a weekly increase of flying hours. This week they are well over the hundred. New members include Mrs. Hyde-Edwards, Miss Schwedler and Mr. Kennedy. Mr. D. A. Brice has gone solo. Visiting machines included a 3-seater Fairchild and the Cessna from Croydon. Mr. J. A. M. Henderson came over quite a lot in his new Monospar. Mr. A. J. D. Allan's *Pou* was out again last week with its new engine, and made a successful flight.

For Ladies Only

FOLLOWING the publication of a letter from the Reading Aero Club, in *Flight* of October 24 last year, asking for suggestions for a suitable competition for lady pilots, that from Mrs. Pyddoke, of the Tollerton Flying Club, was chosen.

The competition is for the Lord Northesk challenge cup and will take place at Woodley on August 8. Marks will be given for taxi-ing, take-off, turns, figures-of-eights and a forced landing—rather on the lines of the normal licence tests and simple enough for a start. Further details can be obtained from the secretary of the Reading Aero Club, Woodley, Berks.

The Finer Arts

WHENEVER gliding people get together one can depend on cheerful informality, equally cheerful disagreement, and, for some curious reason, excellent speeches. Perhaps the business of floating about the sky in silence is conducive to speech-planning—the rest of the world think them out in their baths.

At the London Gliding Club's dinner, last Thursday, Capt. A. G. Lamplugh, the president, took the chair and, in proposing the toast of the club, recollected the day when the club was blown away ("last seen passing Cambridge at 160 m.p.h.") and spoke of the way in which it has since developed on the strength of a team spirit such as is rarely found.

Major H. Petre, before replying, presented two trophies. The first, the Dent Cup, in memory of Mr. David Dent, who did such good work for gliding in general, for the year's outstanding performance, was delivered to Mr. H. C. Bergel for his cross-country flight to Hornchurch, Essex, made with very little previous soaring experience. The Desoutter Cup, also in memory of another great worker, Mr. Louis Desoutter, and presented for the best amateur-built machine, went to Messrs. Morland and Richardson—Mr. Richardson collecting. Major Petre then spoke of Capt. Lamplugh's work.

Proposing the toast of the chairman, Mr. S. Humphries' speech was the very last word in quiet, steady, rambling humour, and he managed to mention almost everyone—including Mr. and Mrs. Turvey, without whom the club could hardly have carried on.

And Now—Biarritz

BETWEEN Monday, July 13, and Sunday, July 26, the Aero Club Basque de Biarritz is arranging an "Air Fortnight" at Parme airport, Biarritz. Some forty-five machines of the French Touring Club are expected, and the programme includes lectures, motor excursions, and military and civil displays in addition to the competitions. Further information can be obtained from the Office Français du Tourisme, 56, Haymarket, London, S.W.1.

Another Fatal "Pou" Accident

THE second fatal accident involving a *Pou-du-Ciel* in this country occurred at Penshurst last Monday, when Flt. Lt. A. M. Cowell lost his life. He had reached a height of 300-400 ft. when the machine went into a dive from which, apparently, the pilot was unable to extricate it.

Flt. Lt. Cowell was formerly a Short Service Officer in the R.A.F. After leaving the service he was in Sir Alan Cobham's displays, and last autumn he joined the Air League of the British Empire as the League's official test pilot for *Poux-du-Ciel*. Cowell had accumulated considerable experience of piloting the *Pou*, and was always very careful over checking rigging and centre of gravity position before taking the machines up. On this occasion, it is understood, he tested the machine first in straight flight and found it satisfactory.

Air Commodore Chamier, of the Air League, has applied to the Air Ministry for the grounding of all *Poux* pending an enquiry.

Editorial comment on the mystery of these machines in dives will be found on p. 475.

Alpine Gliding

SINCE its inception, the Gaisberg Gliding School, near Salzburg, Austria, has achieved considerable popularity, and it is learnt that the Anglo-Continental Express Co., Ltd., of Mitre House, 177, Regent Street, London, W.1, have been appointed as the school's representatives in this country.

It is interesting to realise that the cost of a three weeks' beginners' course, including travelling expenses from and to London and board, is only £16 18s. A number of these courses are held during the year.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

THE LIGHT AND SLOW

MR. STEPHAN'S letter animadverting against the light machine pretends that one sees nothing of the country unless one flies low, and he boldly states that the pleasure of a trip by car consists of the "intervening country." In England, with its hedgerows, one sees very little in winter of that intervening country, nothing in the summer. On the unfenced roads of the Continent one does see more—and it is all uninteresting. In an aeroplane, given reasonable weather, one sees clearly all the features of the landscape, whether natural or artificial, from 2,000ft., a safe and comfortable height. Surely Mr. Stephan's vision is not so defective that he cannot distinguish objects at a distance of 700 yards?

Then he finds that touring at anything under 110 m.p.h. is too boring to be endured and he limits enjoyable flights to ones of three hours. Boredom is a matter of temperament and of intellect. Children are easily bored. Intelligent adults find mental employment whatever their situation. And three hours! One day, two years ago, I spent six hours solo in one flight, landed for fuel and a meal, and continued for another four hours and thoroughly enjoyed the whole of it. My cruising speed was 65. I think the secret of the pleasure of touring by air is that one need never take the same route twice, and the wise tourist is never in a hurry. But the politician is going to make touring impossible with his national air patrols watching for violations of the frontier and his lock-ups ready to receive errant foreigners.

Mr. Stephan mentions sport. There is no sport in flying. There used to be sport in hunting big game. There is none now. Weapons are so powerful that the veriest tyro runs no danger when he is behind one. There is still some sport in fox hunting. Galloping horses still drop their fore legs into ditches or catch them on the top bars of gates. Doubtless when the aeroplane was an unreliable vehicle there was sport in aviation. Now the things are as safe as motor cars, and there can only be skill in the air, not sport, till—there is war. Then there will be sport for a million pilots and use, at the outbreak, for a hundred thousand machines. And my cruising speed will be too low. *Eheu fugaces!*

A. J. RICHARDSON.

North Walsham, Norfolk.

WHEN I wrote the article on "That Elusive Ultra-light Ideal" in *Flight* of April 9 I accepted the need for smaller aeroplanes for several reasons, and mentioned that I had never seen or heard expressed the opinion that serious flying was impossible with less than 70 h.p. So that Mr. Stephan's views (April 30) naturally interest me, although I possess insufficient knowledge of human nature and mass-psychology to attempt to predict exactly how private flying will develop in the future.

My case for the ultra-light is simply that lots of "A" licence holders and a number of sporting motorists are waiting to fly, and cannot afford to do so to any extent behind motors of upwards of 100 h.p. Economy is an important function of efficiency, and the engineer has always sought increased efficiency after achieving reasonable practicability. In 1925 the 27-60 h.p. Cirrus Moth was found capable of doing satisfactorily work that formerly demanded upwards of 100 h.p., and it was hailed as a good thing. So isn't it logical, now that a greater proportion of the population is air-minded and operational facilities have vastly improved, to put out a plea for still more economical flying?

I have never suggested that flying machines will supplant the motor car, but I do suggest that there is already a big enough potential market for the "2½-gallons-an-hour" small aeroplane to keep quite a few firms busy with limited production; that the pioneer firms will be doing very brisk business sooner than many people expect; and that the more pilots we have who fly places in their own machines the better it will be for this country.

Mr. Stephan suggests a number of reasons as to the commercial failure of the ultra-light, which I do not regard very seriously. Sport flying, he maintains, means aerobatic and/or rough-weather flying. While there is really no reason why one should not do quite nice aerobatics with 45 h.p., I doubt if many owner-pilots will ever evolute. Study of existing owner-pilot types, and of their owners' log-books, supports this view, I think. As to rough-weather flying, I fear that most owner-pilots feel too sorry for themselves when they meet bad conditions unexpectedly ever to make a bee-line for the aerodrome for the sheer joy of going up in half a gale. And what of the many young men who are wasting time and money in creating *Poux*? These flea-breeders are super-optimists, I know, but surely they never contemplate doing circus stunts or grappling with 40 m.p.h. head winds, at any rate not intentionally. And these are the people who will one day be saving up their pennies again to buy real low-power aeroplanes.

Naturally the pilot gets a different angle on "scenery" from the motorist, but it is not impossible to cultivate an intelligent interest in things seen from 1,000 ft., and, anyway, an aeroplane allows much time to be spent at places of interest and beauty in this country and abroad. Only this Easter, motoring along the coast near Bude, in the Land's End Trial, I noticed how the hedge continually cut off some really beautiful scenery, and I thought how nice it would be to fly for a time above those sunlit bays. . .

If a pilot cannot bear flying over familiar ground, he can draw a circle round his home aerodrome, divide it into fifty-two equal parts, and cover fresh territory every week-end. Surely Mr. Stephan's remarks re hedge-hopping apply equally to existing light aeroplanes?

On the question of speed, for long-distance touring you certainly want just as much as you can get, and it will always cost money. There are surely plenty of prospective owner-pilots who would be content to put a good day's motoring into less than four hours' flying, for which reason I stipulated a minimum cruising speed of 80 m.p.h. *with a safe 10-15 m.p.h. in reserve.*

Interest in lighter light aeroplanes is growing, and the Light Aircraft Number of *Flight* endorsed the fact that purely pleasure pilots do not set a heavy premium on sheer performance. So I still firmly believe that the ultra-light type will succeed, though the present "pop bottles" may last no longer than those queer cyclecars of the early nineteen-twenties, which paved the way for the baby cars that are so widely used to-day.

W. BODDY.

London, S.W.17.

DECLUTCHING THE PUPIL

I SHOULD be glad to hear the views of others on a point which interests me particularly. It is, I understand, common practice in America and elsewhere to fit control release devices to dual-control machines, by which the instructor may, in case of danger from the pupil, declutch him and throw him out of gear (the former procedure of clutching him and throwing him out of the aircraft being thus rendered entirely obsolete). The official attitude in the R.A.F. is against this procedure; it is not used in civil flying here. What are the objections? There is no doubt that accidents involving the loss of valuable lives have occurred (some two within my personal experience, and several narrow escapes) from this source. Suitable apparatus is available; common sense would seem to dictate its use. It would justify its comparatively small cost from an insurance point of view, apart from the saving of life.

One objection of the R.A.F. pundits is apparently that the instructor should always be able to retain control, and that the presence of such a device would tend to undermine this tradition. This should be answered by the sealing of the device and the obligation to report any breakage of the seal in the log-book, with a possible enquiry into the circumstances. Beyond this, what objections are there?

Leicester. NON-FREEZING PUPIL.

A "Pou" in Piccadilly

THREE actual aircraft—an Abbott-Baynes auxiliary sailplane, a *Pou* of the same make, and an Aeronca—find a place in the aeronautical display being held this month by Simpsons, of Piccadilly, the new London men's store. Among the exhibits are Imperial Airways models and enlarged *Flight* photographs. The store has an aviation clothing department.

AN IMPROVED NIAGARA

Slightly More Power and Detail Refinements

A NEW version of the Niagara radial has been produced by Pobjoy Airmotors and Aircraft, Ltd., of Rochester, Kent. Designated the Niagara III, it incorporates such refinements as an improved reduction gear, more efficient piston and scraper rings; improved tappet housing; a Gits oil seal at the thrust housing and distributor drives; and an oil by-pass system giving adequate lubrication to the connecting rods, pistons and valve gear when cold.

The new rating is 88 h.p. at 3,300 r.p.m. (1.545 airscrew r.p.m.) and the maximum power is 95 h.p. at 3,650 r.p.m. The dry weight is 156 lb. At 65 per cent. of maximum power the fuel consumption is stated to be 4.5 gallons per hour.

The engine is supplied with exhaust collectors; airscrew hub and spinner; air intake; Pobjoy-Tecalemit fuel pump; a new type of long-chord cowling without the "helmets" incorporated in the present cowling; two Rotax four-pole magnetos; Claudel-Hobson AV.40E/1 carburetter; engine tool kit; and log book.

At extra cost the following optional equipment can be supplied: hand- or direct-cranking Rotax electric starter with press button and solenoid switch; screened ignition, automatic hot and cold air intake; and Rotax 150-watt electric generator with switch box, regulator and all necessary connections. A specially designed rubber-damped sub-mounting has been developed.

Inspiration from the Sky

"WHERE only man is vile" is the title of a cloud study by Harold Wyllie in his exhibition, "Four Centuries of British Shipping and Flying in Time of War." That title seems to sum up the theme of nearly every picture on show—seascapes and cloudscapes with the most beautiful of ships or war-time aeroplanes appearing insignificant beside natural grandeur. But make no mistake: Mr. Wyllie can draw and paint ships and aeroplanes which really float and fly: he has served in both. The Imperial War Museum has loaned some of his large oil paintings depicting feats of heroism by R.F.C. pilots (Mr. Wyllie was one) during the war.

The exhibition is at the galleries of Arthur Ackermann and Son, Ltd., 157, New Bond Street, London, W.1, and remains open until June 6.

P. and P. and R.R.

AT the extraordinary general meeting of Phillips and Powis Aircraft, Ltd. held at Woodley last Friday, the shareholders unanimously agreed to increasing the capital to £250,000 by the creation of 500,000 3½ per cent. cumulative convertible preferencé shares of 5s. each. Mr. Charles Powis, chairman and managing director of the company, announced that the whole of the new capital was being subscribed by Rolls Royce, Ltd.

There is no reason to expect that Phillips and Powis will in any way lose their individuality, and the firm will continue, as in the past, to specialise on private owner, training and light commercial aircraft.

Engine installation may have much to do with satisfactory running, and doubtless the fact that they are now associated with a firm of aircraft constructors will be taken advantage of by Rolls Royce, Ltd.

His numerous friends at home and abroad will be interested to learn that Mr. R. J. Parrott has joined Phillips and Powis as general manager. Mr. Parrott was associated with Sir Alliott Verdon-Roe in the early days of flying and for many years afterwards. More recently he joined the Siddeley concerns at Coventry, a connection which he has now severed to take up his new post. Mr. Parrott has had very long experience, not only in aircraft production but in aircraft sales, having travelled abroad extensively.

COMMERCIAL AIRCRAFT and AIRLINES

TO-DAY fortnight, Thursday, May 21, there will appear a Special Number of *Flight* devoted to modern developments in commercial aviation. British commercial aircraft types, from the small charter or taxi machines to the largest liners, will be reviewed and illustrated. Special articles on radio control, the future of the Empire services, and a number of other important aspects of commercial flying will be included.

Thursday FLIGHT ***May 21***

New F.B.I. President

AT the Annual General Meeting of the Federation of British Industries, held recently, Lord Hirst of Witton was elected President for the coming year. Lord Hirst was one of the founders of the General Electric Company, Ltd., of which he became managing director in 1900 and chairman in 1910.

The Scorpion Engine

IN regard to last week's announcement on the future of the A.B.C. Scorpion engine, it should be made clear that Marendaz Special Cars, Ltd., have not purchased the rights, but an option on the rights, which remain the property of A.B.C. Motors, Ltd.

The latter concern is at present very fully employed on Government contracts.

Hong Kong's First Air Mail

WHEN the Imperial Airways machine *Dorado* landed recently at the Kai-Tak airport, Hong Kong, carrying the first air mail to be flown through from London, there were scenes of great excitiment. A big crowd assembled at the airport and among those present was H.E. the Governor, Sir Andrew Caldecott. A number of R.A.F. aircraft flew out to meet the machine.

Quickly and Comfortably

AS reported in *Flight* last week, Mr. C. J. Melrose recently completed a sixteen-day flight to Australia in the first production Heston Phœnix. On Wednesday of last week the makers of the machine, the Heston Aircraft Co., Ltd., received from him this cable:—

"Phœnix landed Adelaide splendid condition all pilots and passengers en route impressed with performance and extreme comfort of VH-AJM average 125 m.p.h. from London highly satisfied myself."

The Phœnix left Heston on April 9 and arrived at Adelaide on the 25th.

Incidentally, it is stated that the sparking plugs used by Mr. Melrose were of K.L.G. manufacture and not, as in the list of equipment issued at the time, of another make.

More Civil Aerodromes for Empire Air Day

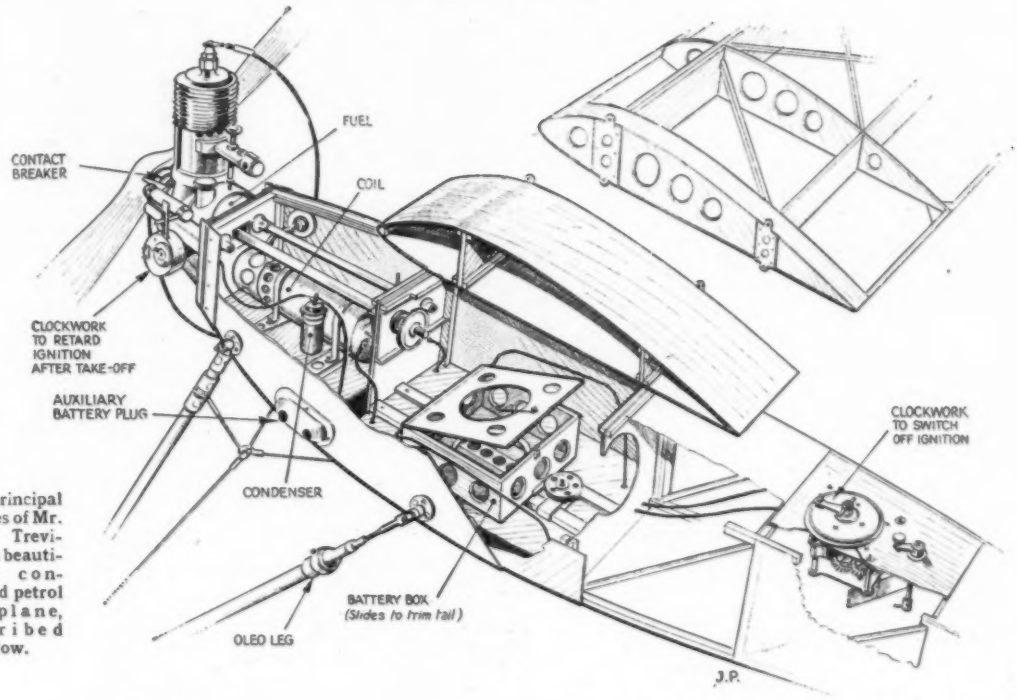
IN addition to the list given in *Flight* of April 16, the Air League announces that the following civil aerodromes and flying schools will be open to the public on Empire Air Day, May 23:—

Churchdown Aerodrome (Cotswold Aero Club); Lympne Airport (Cinque Ports Flying Club); Braunstone Airport; Desford Aerodrome (Reid and Sigrist, Ltd., Reserve School); Skegness Aerodrome (Aircraft Distributors, Ltd.); Tollerton Aerodrome (Tollerton Aero Club), Sywell Aerodrome (Brooklands Aviation, Ltd., Reserve School); Witney Aerodrome (Witney and Oxford Aero Club); Brooklands Aerodrome (Brooklands Flying Club); City Aerodrome, Meir, Stoke-on-Trent (North Staffs. Aero Club); Sherburn-in-Elmet Aerodrome (York County Aviation Club); Brough (North Sea Aerial and General Transport, Ltd., Reserve School); Hull Municipal Airport, Hedon (Hull Aero Club); Macmerry Aerodrome (Edinburgh Flying Club).

MODELS

Petrol and Clockwork : "Northern Heights" Gala Day : Club News

By M. R. KNIGHT



The principal features of Mr. R. J. Trevithick's beautifully constructed petrol monoplane, described below.

Petrol Ingenuity

ILLUSTRATED above is the petrol-engined high-wing monoplane recently produced by Mr. R. J. Trevithick, chairman of the Model Aircraft Club. It is a machine which combines an attractively simple outline with effectiveness, ingenious constructional features and perfect workmanship.

The cantilever straight-chord wing is 6ft. 6in. in span and is in three parts which bolt together. The section is Clark Y 18. The leading edge is a length of $\frac{3}{16}$ in. × $\frac{3}{16}$ in. spruce, placed on edge and subsequently rounded off; the trailing edge is of $\frac{3}{8}$ in × $\frac{1}{4}$ in. spruce, brought to a fine edge. In the outer sections of the wing the front and rear main spars have spruce flanges and a balsa web, but in the centre section the flanges are of birch, and the web of satin walnut. Diagonal bracing of $\frac{1}{8}$ in. × $\frac{1}{16}$ in. birch connects front and rear spars. The dihedral angle is built into the centre section. The ribs are cut from $\frac{1}{8}$ in. balsa sheet, and holed for lightness. Bamboo is used for the wing-tips. The wing is attached to the fuselage with rubber bands, the attachment hooks on the wing being arranged to swivel, thus obviating the tendency of wing-tip blows to crush the longerons. Another simple device guards against displacement of the wing through vibration.

The tailplane is built similarly to the wing, but the section is very nearly symmetrical. Trimming tabs of aluminium have proved highly effective. The fin is double-surfaced.

The undercarriage shock-absorber legs are of $\frac{3}{8}$ in. Dural tubing containing oil and operating on the true oleo principle. The wheels are rubber balls, bolted between spun aluminium discs. There is a sprung tail wheel.

The fuselage is a rectangular structure, comprising four longerons of $\frac{3}{16}$ in. × $\frac{3}{16}$ in. spruce, and "Oxford frame" bulkheads. The front portion is covered with 0.75 mm. three-ply, which in turn is covered with aluminium sheet to facilitate cleaning. The battery box is mounted in the forward part of the fuselage and on rails, so that it can slide for the purpose of correcting longitudinal trim. A celluloid inspection port enables the battery position to be checked after each landing. Another window is so placed as to permit inspection of the coil and condenser. Wing, fuselage, and tail are covered with Jap silk, clear doped.

The engine is a rebuilt American Brown Junior 10 c.c. two-stroke, turning an airscrew of 14 in. diameter and 10 in. pitch at 4,700 r.p.m. It is mounted offset 7½ degrees to counteract torque reaction, and there is a sheet of cork between it and the fuselage. The thrust, as indicated by spring balance, is 2 lb. 11½ oz.! There is a clockwork control of the engine advance and retard gear, and clockwork automatic time switch. Control to within three seconds has been obtained. An ingenious device, similar in principle to the D.H. strut-type A.S.I., is now being fitted, whereby, should the operator omit to release the time switch, it will automatically be brought into action by means of a vane when a certain air speed is reached.

The total weight of the model is 3 lb. 9½ oz. So far, the duration of flights has been kept down to one minute, but tankage for 3½ minutes is provided.

"Northern Heights" Gala Day

MR. C. R. FAIREY has again kindly given permission for the highly popular Gala Day annually sponsored by the Northern Heights Model Flying Club and held at the Great West Aerodrome. The date is Sunday, June 21. Five contests are scheduled.

There is a Concours d'Elegance, with separate sections for (a) power-driven models, (b) non-flying scale models, to any scale, (c) gliders and rubber-driven models, and (d) Juniors, any type of model. The Duration Contest is in two sections, lightweights (total weight of over 2 oz., but under 5), and heavyweights (5 oz. and over). The average of three hand-launched flights will be taken. In the Inter-Club Team Contest each team will comprise one lightweight and one heavyweight, the *loading* of which respectively must be 4 oz./sq. ft. and under and 5 oz./sq. ft and over. Entries from clubs, enclosing fee of 10s., must be received by June 18. The *Flight* Cup will be held for one year, and a replica awarded to the winner of a contest for flying scale models, built to any scale. The average of three hand-launched flights will be

taken. One notes with satisfaction the rule that the wings must be fitted in the true scale position. Lastly, there is a Snapshot Contest.

A programme giving full particulars will shortly be available at 4d., post free, from the Hon. Sec., Mr. H. C. Chatterley, 117, Cranston Road, Forest Hill, London, S.E.23.

Wakefield Elimination Trials

THE Elimination Trials for the choosing of the team which will compete in America for the Wakefield Cup will be held at Fairey's Great West Aerodrome on Sunday, May 17. Entries can be accepted up to May 11 (inclusive) on a special form obtainable from Mr. J. C. Smith, 1, Treen Avenue, Barnes, S.W.13.

Mr. F. R. Barnard has presented to the S.M.A.E. the Premier Shield, which will be held for twelve months, and a replica plaque, awarded to the British competitor making the highest average in the Trials.

Pilcher Cup Contest

SNOW, sleet, rain, and wind greeted the opening of the 1936 season on April 12, when the Pilcher Cup was competed for simultaneously on the affiliated clubs' grounds. Reports speak of snowy showers at Dartford Heath and Birmingham, all models saturated at Cockfosters, and all models smashed in strong wind at Manchester! Thirty-four models took part in the contest. The winner was Mr. C. Gibson (N. Kent Club), who averaged 4 min. 2.73 sec. on three rise-off-ground flights; Mr. R. J. Harmer (Bournemouth Club was second with 3 min. 4 sec., and Mr. W. Worden (T.M.A.C.) third with 1 min. 26.416 sec.

Other Models News

This year the S.M.A.E. is awarding the *Flight* Cup to the winner of the Speed Contest, which will be held on May 31. Intending competitors should write to Mr. J. C. Smith, 1, Treen Avenue, London, S.W.13, who will advise them of the venue.

* * *

A contest for juniors (under sixteen), without entrance fee, is being held by The Model Aircraft Club at the end of May. Particulars and entry form are available from Mr. H. Fialko, 31, Whites Row, London, E.1.

* * *

At the recent annual Skybird League rally the *Flight* prize was awarded to Club 384 (leader, R. A. White) for a model of the Gloster Gauntlet. The judges were Air Commodore Chamier and Messrs. W O. Manning and J. H. Stevens.

* * *

*The Complete Model Aircraft Manual,** an American work, by Edwin T. Hamilton, should provide models enthusiasts with many hours of absorbing interest and instruction. The following selection will give some idea of the range of subjects dealt with in its 600 pages: tools, materials, cutting and bending balsa, balsa presses, built-up wings and fuselages (with lucid diagrams depicting the stages of building and covering), propellers (bent wood, carved, laminated, two-, three-, and four-bladed), wheel construction, spats, ring cowlings, model parachutes, gliders and sailplanes, practical flying, solid and built-up scale models (non-flying), designs of six flying scale models (including two Autogiros), an airship design, carrying cases for models, aviation dictionary, glossary of model terms. Cross-references and line sketches and photographs add considerably to the value of the book.

* 12s. 6d., *John Lane, The Bodley Head.*

Stockholm Festivities

CERTAIN details are now available regarding events to be held in connection with the Stockholm Aero Show, which opens on Friday week, May 15, and continues until June 1.

On Saturday, May 23, the new Stockholm Airport, Bromma, will be officially opened, and will also be the scene of the start and finish of the Nordic Air Races round southern Sweden. A flying display will also be held. In the evening there is a banquet at the City Hall. On the following day, May 24, there will be another flying display, followed by a dinner, dance and prize distribution at the Grand Hotel Royal.

On Monday, May 25, there will be technical demonstrations at Bromma and a luncheon will be given in connection with them.

The organisers have gone to very considerable lengths to attract visitors by air. Landing fees are being waived, hotel charges reduced, and a special publication "The Swedish Air Pilot" being produced for the guidance of British aerial visitors.

This handbook (price 2s.), together with any other information required, is obtainable from the Royal Aero Club, 119, Piccadilly, London, W.1, or from the organisers, I.L.I.S., 33, Kungsgatan, Stockholm.

It should be noted that no landing is permitted at Bromma before May 20; until then the Barkarby Aerodrome must be used.

In addition to the list of probable British exhibitors given in last week's issue of *Flight* must now be added the name of Aircraft Components, Ltd., makers of Dowty landing equipment.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

THE NORTH BRITISH AERO CLUB LTD., was registered as a public company in Edinburgh on April 21, with a nominal capital of £2,000 in 5,000 shares of 1s. and 1,750 shares of £1 each. The objects are to promote, encourage and develop the sport, science and practical application of aviation and aeronautics, etc. The subscribers are E. L. Gandar Dower, "Butlers Croft," Dyce, Aberdeenshire, director of Aberdeen Airways, Ltd. (1,100 £1 shares); C. Brunning, director of Aberdeen Airways Ltd.; R. S. Bisset, builder; E. Allen Starling, commercial air pilot; J. Maclennan, civil engineer; Roland Morris, flying instructor; Robert D. Dee, garage proprietor.

GLASGOW AIRCRAFT COMPANY, LTD. Private company, registered in Edinburgh April 23. Capital £1,000 in £1 shares. Objects: to carry on the business of manufacturers and repairers of and dealers in aircraft of all kinds. The subscribers are W. Menzies Anderson, 92, Bath Street, Glasgow, C.2, solicitor, and Ian R. Mitchell. The first directors are not named.

JABLO LTD. Private company, registered April 24. Capital £1,000 in 10s. shares. Objects: to develop and manufacture the patented designs and inventions of Bruno Jablonsky and to carry on the business of manufacturers of airscrews, aeronautical engineers, etc. The first directors are Hamilton Fulton, 52, New Broad Street, London, E.C.2., and Harry Delacombe.

F. HILLS AND SONS LIMITED was registered as a public company on April 22 with a nominal capital of £150,000 in 4s. shares. The objects are to acquire the undertaking and assets of F. Hills and Sons Limited (incorporated 1921), and to adopt an agreement with the said company and C. C. Akers, and to carry on the business of joinery and plywood manufacturers, constructors of aircraft; timber merchants, etc. The following persons have consented to be directors. Arthur G. Murrell (director of West of England Joinery Co. Ltd.); Edwin J. Murrell (director of May and Hassell Ltd.); Walter R. Chown, joinery manufacturer; Leonard Brooker, joinery works manager; Wilfred May, joinery works manager; Thomas C. Black (director of Campbell-Black Aviation Ltd.); William Jowett (managing director of Jowett Cars Ltd.). The registered office is at Joinery Works, Norton Road, Stockton-on-Tees.

UNIVERSITY AERO CLUB, LTD.—Registered as a public company on April 29, with a nominal capital of £400 in 2,000 ordinary shares of 1s. each and 300 preference shares of £1 each. Objects: to promote and develop aviation; to establish and conduct a club, etc. The management is vested in a council, the first members of which are: Montague P. Fry, M.A., 37, Tenison Road, Cambridge, schoolmaster; Richard S. Hays, B.A.; Cyril H. Porter, engineer; William G. Francis, sales manager; Edward R. Skinner, engineers' articled pupil; Jack A. Nichols, student; Leonard G. North, sales manager. Secretary: Richard Hays. Registered office: 18, Jesus Lane, Cambridge.

INCREASES OF CAPITAL

H. D. R. AIRWAYS LTD. (53, Parliament Street, London, S.W.1). The nominal capital has been increased by the addition of £99,900 in £1 ordinary shares beyond the registered capital of £100. The directors are Wm. D. L. Roberts (director, British Airways Ltd); Fdk. L. Crilly (director Crilly Airways Ltd.); Gerard d'Erlanger (director, British Airways Ltd.), and John R. McCrindle (director, British Aiways Ltd.).

It is proposed to change the name of the company to British Airways (Iberia) Ltd.

FAIREY AVIATION COMPANY LTD. (North Hyde Road, Hayes, Middlesex).—The nominal capital has been increased by the addition of £750,000 beyond the registered capital of £500,000. The additional capital is divided into 1,500,000 ordinary shares of 10s.

H. M. HOBSON (AIRCRAFT & MOTOR) COMPONENTS LTD. (47-55, The Vale, Acton, London, W.3.).—The nominal capital has been increased by the addition of £50,000 beyond the registered capital of £150,000. The additional capital is divided into 200,000 ordinary shares of 5s. each.

BRITISH AIRWAYS LTD. (Terminal House, Grosvenor Gardens, London, S.W.1).—The nominal capital has been increased by the addition of £54,760 in £1 ordinary shares beyond the registered capital of £245,240.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

Published May 7, 1936.

25493. AYRES, W. H. (Ayres, H. P.), and TILTMAN, A. H.: Controls, air brakes, and the like, for aeroplanes. (445,270.)

28399. DUNLOP RUBBER CO., LTD., GOODYEAR, E. F., WRIGHT, J., and TREVASKIS, H.: Aircraft controls. (445,202.)

28601. AKT.-GES. C. P. GOERZ OPTISCHE ANSTALT: Apparatus for determining the dropping angle for launching missiles from aircraft. (445,298.)

28781. JACKAMAN, A. C. M.: Buildings, particularly for airports. (445,426.)

28821. TYLER, S. H.: Anti-dazzle devices for vehicles or aircraft. (445,356.)

34987. BRISTOL AEROPLANE CO., LTD., and RUSSELL, A. E.: Aircraft structures. (445,437.)

14508. SIEMENS APPARATE UND MASCHINEN GES.: Arrangement for regulating the speed of the propelling gear of an aircraft. (445,447.)

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